approach

JUNE 1969 THE NAVAL AVIATION SAFETY REVIEW

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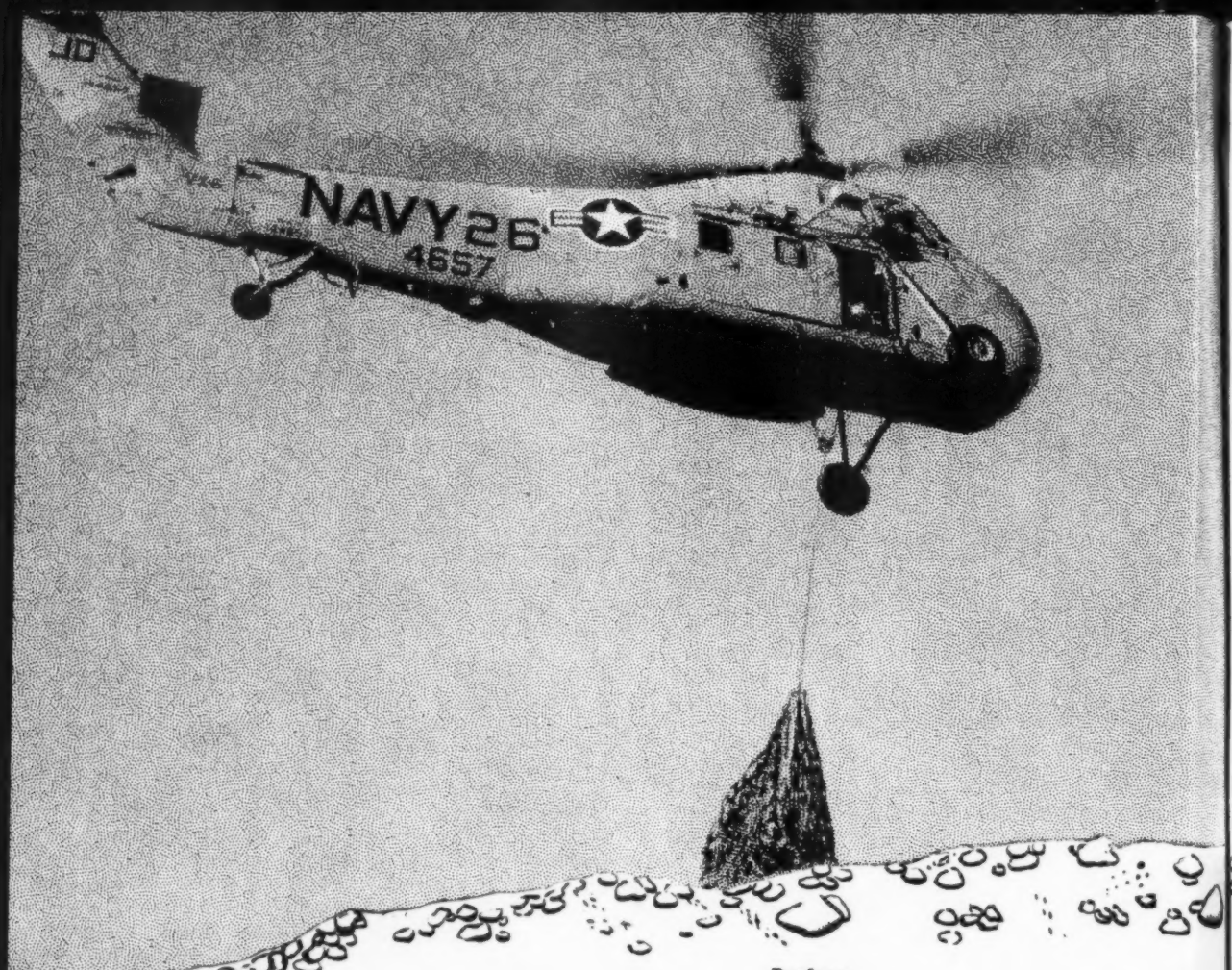


Preface

In order to illustrate that the problem of ground resonance has been with us a long time some excerpts from an article written in 1957 by (then) BUAER's HSS-1 Project Officer, Lt A. D. Hight, USN, are appropriate.

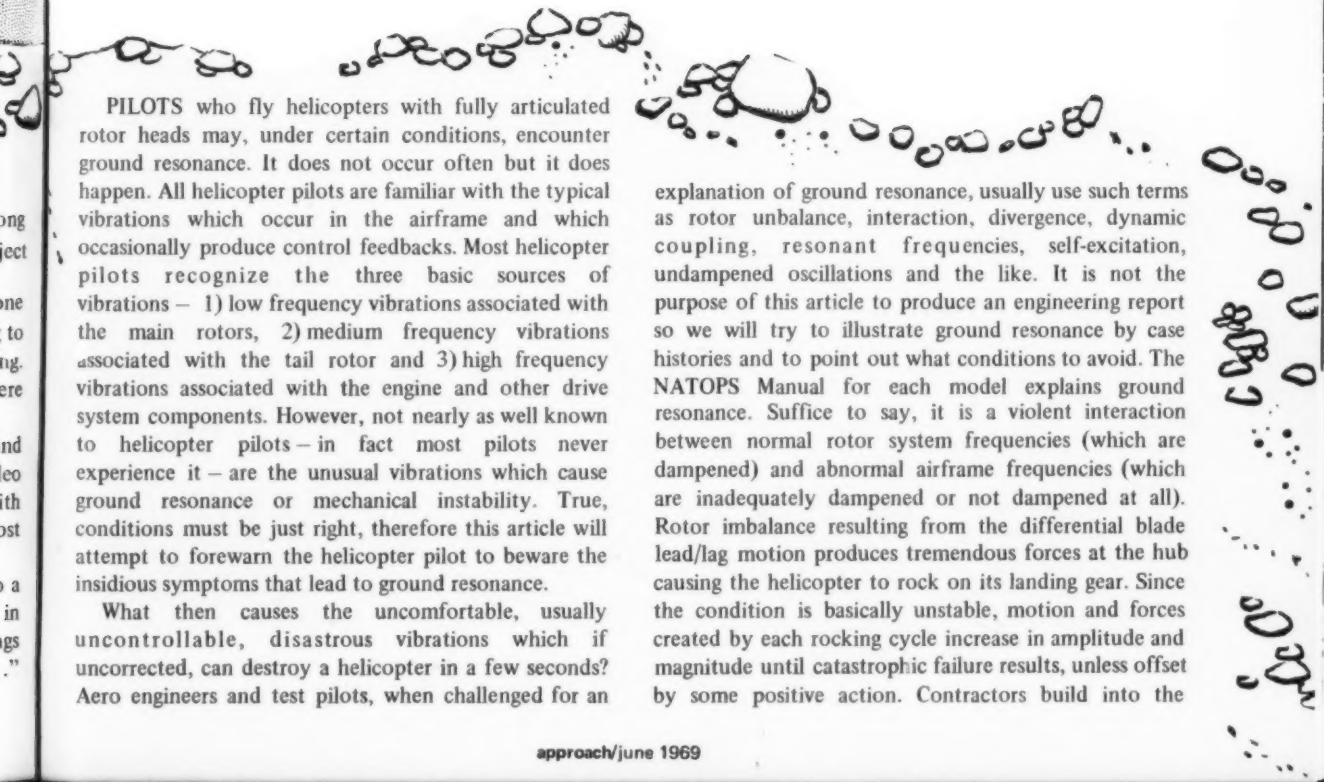
". . . Briefly, the study revealed relatively few known cases of resonance. . . . In one case, threads of a damper drain plug were stripped to an extent that allowed the plug to be blown out of the damper. The helicopter went into ground resonance upon landing. The other two cases of damper malfunctions were newly assembled aircraft which were turned up without properly serviced dampers.

"The importance of good maintenance procedures toward preventing ground resonance in all helicopters can not be overemphasized. Proper tire inflation, correct oleo strut inflation and operation, in addition to properly serviced main rotor dampers (with uncontaminated fluid and correctly bled by the 'walk thru' method) are of the utmost importance.

"The helicopter, after being properly serviced and maintained, will not enter into a resonant condition of its own accord during a normal controlled landing. Excitation in the form of cyclic stick movement or unbalanced landing gear reaction during landings under certain conditions will supply the forces necessary to induce ground resonance . . ."
(Note: Just as true today! – Ed.)

Helicopter Dynamic Instability or

GROUND RESONANCE



PILOTS who fly helicopters with fully articulated rotor heads may, under certain conditions, encounter ground resonance. It does not occur often but it does happen. All helicopter pilots are familiar with the typical vibrations which occur in the airframe and which occasionally produce control feedbacks. Most helicopter pilots recognize the three basic sources of vibrations – 1) low frequency vibrations associated with the main rotors, 2) medium frequency vibrations associated with the tail rotor and 3) high frequency vibrations associated with the engine and other drive system components. However, not nearly as well known to helicopter pilots – in fact most pilots never experience it – are the unusual vibrations which cause ground resonance or mechanical instability. True, conditions must be just right, therefore this article will attempt to forewarn the helicopter pilot to beware the insidious symptoms that lead to ground resonance.

What then causes the uncomfortable, usually uncontrollable, disastrous vibrations which if uncorrected, can destroy a helicopter in a few seconds? Aero engineers and test pilots, when challenged for an explanation of ground resonance, usually use such terms as rotor unbalance, interaction, divergence, dynamic coupling, resonant frequencies, self-excitation, undampened oscillations and the like. It is not the purpose of this article to produce an engineering report so we will try to illustrate ground resonance by case histories and to point out what conditions to avoid. The NATOPS Manual for each model explains ground resonance. Suffice to say, it is a violent interaction between normal rotor system frequencies (which are dampened) and abnormal airframe frequencies (which are inadequately dampened or not dampened at all). Rotor imbalance resulting from the differential blade lead/lag motion produces tremendous forces at the hub causing the helicopter to rock on its landing gear. Since the condition is basically unstable, motion and forces created by each rocking cycle increase in amplitude and magnitude until catastrophic failure results, unless offset by some positive action. Contractors build into the

aircraft safety features which, under most conditions, prevent a rocking/pitching airframe. This is done by dampers for the rotor blades, special design of landing gear oleos and specific air pressure for the tires. All of these safety features obviously are designed to absorb or minimize the abnormal vibrations.

Any set of conditions which upsets the designed dampening features of helicopters can cause the beginning of ground resonance. For instance, a pilot who lands hard on one MLG or who lands with one wheel higher than the other – such as on a mound or raised padeye – may induce destructive rocking vibrations. Ground resonance can also be induced when built-in safety features are bypassed – such as starting the rotor with tiedowns so tight that the oleos are restricted or, if high point tiedowns are used, bypass the shock struts. (The NATOPS manual clearly prohibits rotor engagement with high point tiedowns attached.) Another condition known to have started ground resonance is raising the collective pitch too slowly or overcautiously on takeoff. One other condition which recently came to light and includes all the ingredients necessary for ground resonance, is a run-on landing on a rough surface.

Case Histories

An experienced pilot with several *thousand* hours in helicopters landed his H-34 aboard a carrier. It went into ground resonance, (reason unknown but an unbalanced rotor head or stuck oleo is suspected) burst into flames and even though the pilot got airborne again it was too late to save the chopper. The series of pictures below shows the aircraft after the second landing and after the crew had evacuated.

Another H-34 pilot had a little more time after the onset of ground resonance than the pilot in the previous illustration. This pilot had been engaged in a heavy load vert-rep operation. As he landed and lowered collective the helicopter entered ground resonance and began to hop back and forth on the MLG. Even though his rotor RPM had decreased to below 1800 he took off and gradually got his turns back. Seven more attempts to land were made (with various RPM settings and various conditions) all unsuccessfully – each time that his wheels touched the deck ground resonance began. Ultimately, the pilot off-loaded his crew in a hover and the helicopter was ditched. In this case, as in the first example, a malfunction of the dampening features was suspected.

The pilot of a UH-2 was turning up aboard an icebreaker checking the rotor blade track. The helicopter was secured high and low with quick release chain tiedowns. The high point tiedowns were not removed (contrary to the NATOPS manual) and as Nr reached 40 percent the aircraft entered ground resonance. Before the blades could be stopped the tail pylon buckled, the tail wheel sheared off at the oleo attachment point and the intermediate tail rotor gear box was displaced. In this case the design features of the struts were restricted.

The examples are numerous. Upon completion of a recon insert mission the pilot of a CH-46 made a roll-on landing with about 15-20 kts ground speed. During rollout on marston matting laid over rough ground, abnormal vibrations began and quickly increased in severity. Ultimately, fore and aft blades intersected and the aft pylon separated. Contributing to the condition was a cracked (dry) oleo and tire pressures below

The effects of ground resonance are usually disastrous.

normal. Again safety features (oleos and tires) were rendered inoperative and destructive forces shook the helicopter to pieces. *(In Sept '67 Vertol conducted a series of tests with a CH-46 under controlled conditions at Pax River and they were able to induce ground resonance in roll-on landings on a rough, patched runway. – Ed.)*

In the last case to be used for illustration the pilot of a UH-34 turned up on the line for a maintenance check following replacement of four rotor blade dampers. At about 1200 rpm the aircraft suddenly entered ground resonance. A violent oscillation took place when the tail skidded sideways. The helicopter hopped back and forth from wheel to wheel until the starboard wheel sheared. In this case improper damper servicing was responsible for the accident.

In each case recounted, conditions were just right to set up dynamic coupling between the rotors and the airframe. In the majority of cases cited there were minor injuries to personnel, both flight crew and line personnel, in addition to airframe damage. The pilots involved in these accidents reported that the degree of discomfort at the onset of ground resonance was very high and that they were utterly helpless, even though strapped in, during the fully developed, destructive cycle. In other words, stop ground resonance as soon as it manifests itself otherwise one is unable to do anything after it is fully developed – and it will destroy the helicopter.

Of all the NATOPS manuals, the H-34 manual goes into more detail than the others on the subject. For the benefit of all helicopter pilots the following tips are quoted: "The occurrence of ground resonance can be minimized by observing the following precautions:

- The stick trim system should be engaged in order to reduce the pilot's tendency to aggravate the conditions by allowing the cyclic control stick to move with an oscillation which may have already started and would dissipate if the cyclic control stick were held stationary.

- The oleo struts should be watched for any tendency toward undue binding during takeoff and landing.

- The tail wheel should be locked during takeoff and landing. Should these procedures fail to eliminate ground resonance and permit a safe landing, assume that the rotor head is in an out-of-balance condition or a damper is malfunctioning. When this condition occurs it is recommended that the pilot attempt to land on softer terrain. If resonance is still encountered, hover the helicopter in an attitude that will permit deflation of the tires by any available method such as removal of the

Everyone came out to see the damage.

The right MLG sheared within seconds.

The complete aft pylon flew overhead.

Ground Resonance Accidents

Models	Totals	Calendar years 64	65	66	67	68
H-1	None					
H-2	2	–	–	–	1	1
H-3	None					
H-34	11	*5	1	2	2	1
H-46	4	–	–	–	3	1
H-53	None					

*Decrease in H-34 ground resonance accidents attributed to redesign of landing gear.

Report of Training Command and Some Squadrons

In response to three questions sent to HT-8 in March 1969 and a sample of Navy HC/HS squadrons the following summary was compiled:

Q. Any knowledge of instances of ground resonance?

A. Seven. (Includes more than one report on the same accident.)

Q. Do you cover ground resonance in ground training or all-pilot meetings?

A. All activities reported that the subject is covered.

Q. What material is available to pilots on this subject?

A. NATOPS manuals, NAMTD pilot's ground school, formal lecture by ASOs, articles in the activity safety education publication, *"Sikorsky Helicopter Flight Theory for Pilots and Mechanics"*, Vertol films "CH-46 s/n 152517 Accident Simulation and Detailed Washboard Runway Test Results (Pax River Nov 14/17 1967)" and "CH-46D s/n 152517 Accident Simulation Mechanical Instability Testing; 5 in. Drop (Pax River Sept 1967)."

valve cores or puncture of the tires. If ground resonance is still encountered after all eliminating measures have been taken, land through the ground resonance and stop all helicopter motion as soon as possible after landing."

A review of normal day-to-day operations, to deter setting up the conditions for ground resonance, is in order. This would include avoiding low RPM while light on the wheels, overloads (high gross weights), improperly inflated tires and struts and operations with worn or weak rotor dampers.

A combination of conditions must exist to cause ground resonance. There must be an unusual lead/lag condition to unbalance the rotor system and there has to be an unnatural reaction between the aircraft and the ground. Once started there are only two ways to stop ground resonance. *The preferred way is to get airborne* – which stops the interaction. The other way is to bottom the collective, cut the engines and apply the rotor brake and wheel brakes. ◄

APPROACH gratefully acknowledges the help of the Customer Service Managers of Vertol and Kaman and the Rotary Wing Branch, Pax River in the preparation of this article. The information displayed in the summary box was provided by HT-8, HC-2, HC-4, HC-5, HC-6, HS-1 and HS-10.

Stop 'Playing Safe' . . . Work at it!

CLOSE CALL

By A. L. Cole

AIRCRAFT accident investigations are meticulously carried out in an effort to acquire information which can be useful in preventing further occurrences of a similar nature. This valuable knowledge is not always discovered; consequently, these cases must be written off as "unknown." We are able to gain insight from our misfortunes, but the process can often be expensive. Of course this expense is minimal when compared to the immeasurable profits of lives and aircraft that may be saved by proper use of the knowledge acquired. Infrequently the cause factors of an aircraft accident are discovered without the extensive efforts and expense of an aircraft accident investigation. This happens when incomparable airmanship precludes the inevitable accident.

"The pilot and NFO of the T-1A aircraft had departed home plate on a routine post calendar check test flight. The aircraft was leveled at 4500 ft to maintain VFR conditions under a thin scattered cloud layer. At a position 10 miles southwest of the field, power was added to recommence the climb. A rapid deceleration of the engine occurred. (At this distance and altitude, the optimum glide speed would barely place the aircraft near the approach end of the runway.) The pilot's immediate reaction was to turn toward the field and attempt an airstart. Having no success, a second airstart was tried using only the battery. Fuel was then dumped and the IFF switched to emergency. The NFO transmitted on guard with no reply and prepared for ejection.

"The pilot paralleled the coastline inbound allowing him to discontinue the approach if necessary by turning seaward. Seeing that he could make the runway he lowered the landing gear and flaps. The emergency system was utilized for the gear. At about one mile the speedbrakes and tailhook were activated. The arresting gear was engaged at 100 kias. There was no damage to the aircraft or injury to the personnel involved. The cause of the flameout was attributed to maintenance error. A coupling nut on the hose assembly from the air adapter to the fuel manifold had not been torqued properly."

The pilot's extensive knowledge of aircraft performance characteristics and timely actions prevented another costly aircraft accident. Cause factors for the flameout were glaringly evident and the expenses incurred in obtaining this information were negligible. Maintenance error was prevented from again entering the accident statistics that we are constantly trying to reduce. A clear profit was realized from what could have been a catastrophe. Clear profits should be shared as well as those profits that cost money and lives. Proper reporting and dissemination of information is a must if we want to multiply the profit. ◄

'A Funny Thing Happened to Me on the W

By LT D. B. Frye
HS-1

THERE comes a time in every aviator's life when he becomes faced with a unique situation, where the decision made can, and often does, mean the difference between survival and loss of life, or loss of his aircraft. The chances of the right decision are perhaps better in a multipiloted aircraft rather than single-place aircraft, in that two heads are often better than one.

We were southbound from Navy Quonset, IFR at 8000 ft enroute to Navy Norfolk in an SH-3A. Air Traffic Control (ATC) had cleared us as requested and our climbout and departure had been routine. Once southwest of Block Island we were switched to New York Center and the flight proceeded routinely in and out of the cloud layers at 8000 ft.

Our immediate concern at the time was lunch at Norfolk and whether the Scopy Tone would be operational for the favorite number featuring Brazilian Bikinis on the beach. Occasionally, far below, the open sea was visible between the breaks in the cloud layers. All in all, it was a perfect cross-country and weather at destination was not expected to be of any consequence. A routine scan of the instruments showed no adverse engine or flight indications and all that remained to be done was follow the instructions of New York Center. As we approached Dutch intersection on V-139 our crewman reported that there was a substantial water leak coming in from the overhead just aft of the pilot compartment. Instantly the adrenalin began to flow for we were not in any visible moisture other than a few puffy clouds. We were certainly not in any areas of general precipitation!

I leaned back and with my left hand collected some of the water-like liquid. Suspicions were shortly confirmed by smell . . . JP-4! The initial flow was modest, but since the deactivation of the fuel pressure gages in the aircraft there was no accurate means of

he Way to the Forum'

determining which engine had developed the leak. We continued, without notifying center, trying to determine the source of the leak. Removal of the soundproofing in the general area failed to determine the source but did contribute measurably to the increased flow through and around overhead fittings and lines in the neighborhood of the No. 1 engine.

By this time the flight had approached the point where neither pilot considered the situation routine. The cloud deck had become solid below and with the fuel leak increasing its flow a very real fire hazard became apparent. The question was which engine had developed the leak? The greatest flow was in the approximate position of the titanium firewall between the two engines. There wasn't much doubt that we should secure an engine to eliminate the problem, but which one? The nearest divert field at this point was Navy Lakehurst or Atlantic City. We decided on the former and declared an immediate emergency on center frequency. New York Center responded admirably clearing all other traffic off the frequency once they were advised that we had a severe fuel leak and a serious fire hazard prevailed. We requested descent to minimum obstruction clearance altitude in order to get below the cloud deck and received the clearance immediately. By this time the tempo of the leak had increased to the point where the copilot was beginning to get the spray from the leak. In view of the more left sided position of the leak we decided to secure the No. 1 engine in hopes of stopping the fuel flow. The call for full power was given for both engines and at this time the No. 1 engine dropped with a torque split of about 40 percent. Whether or not this indication was valid in itself, we were wholly convinced that the No. 1 engine was the engine with the leak. The speed lever was retarded to the idle position and fuel flow abated rapidly. The engine was then secured along with the fuel firewall valve and fuel boost pumps. Within approximately five minutes the leak abated completely and the aircraft began to clear itself of the fuel and fumes from the leak. Passing a descent altitude of 3000 ft we broke into the clear and so advised the center.

New York then switched us to Navy Lakehurst Approach Control for a radar monitored approach to an uneventful single-engine landing.

In retrospect the calm and efficient controller contributed significantly to our uneventful approach and landing. At no time was there concern for what I would be expected to do, for the Center Controller had coordinated beautifully with the approach controllers. My first radio transmission on the new frequency was met with "Roger 59, Radar Contact, and that will be a right turn to a modified base and an approach to runway 15. Crash assistance and crews are standing by." Being contact greatly assisted in reducing the pucker factor and maintaining the calm that prevailed.

Once the aircraft was successfully brought to a stop we exited rapidly with crash crews monitoring closely. Inspection revealed a flow divider to the No. 1 engine had cracked completely through the low pressure side and partially into the high pressure side. The burner basket section of the aircraft engine was well sprayed with fuel and residual fuel was still prevalent throughout the engine compartment. We considered our situation extremely fortunate in that an engine fire did not develop. . . . And then too, there was a certain amount of satisfaction that we did troubleshoot correctly and that we were able to eliminate the problem and bring the aircraft and its crew back intact to fly another day. While we didn't make it to the Forum as early as we had planned we did eventually make it. We enjoyed our visit more than we had previously anticipated! ◄

In the Spirit of the Game

This article is based on a letter received from an ASO (see box). Because of the length of the reply and its potential interest to Fleet units both the letter and our reply are offered as a feature article rather than as a part of the regular Letters section. – Ed.

After your cordial (and in the spirit of the game) reply to our *Headmouse* question, I ha to write you guys just to beak you again – bu that's what I'm doing.

Here's why: In your lead article, pages 1 April APPROACH, you have managed to discu the subject of takeoff aborts without e mentioning (1) Required excess thrust (which what makes the airplane fly); (2) Sto jettisoning (which may be necessary to make airplane fly *or* to enable it to stop); a (3) Braking capacity (which if you don't ha arresting gear – or miss the gear – is all yo have left to stop the airplane). I red pencill my copy with the comment: "Incredible!"

What you folks in the safety educati business have got to understand is that pio pleas about NATOPS (God! how sick I am o that acronym!) fall on deaf ears when th readers are aware that the Navy has bou tactical airplanes that don't have enough thru to fly (e.g. A-4 or A-7 on a hot day) or enou braking capacity to stop in a takeoff abort a liftoff. Fix these dismal (and inexcusab problems and the crews will take care of th end of it.

Aviation Safety Offic

Dear ASO:

In preparing an article on takeoff aborts, such as the one in the April issue, it is necessary to limit the discussion to manageable proportions. In our article we sought to emphasize those points which have wide application to all readers regardless of the model aircraft operated. To this end, we stressed:

- *The need to know your aircraft.*
- *The need to know your operating field layout and facilities.*
- *The need to plan and brief each flight.*
- *The need to know NATOPS procedures.*

With more than 30 series of fixed-wing aircraft in the Navy's inventory and with up to 10 models in each series you can see why a general article on the subject of takeoff aborts must necessarily avoid discussion of specific abort procedures for specific aircraft if the article is to maintain any semblance of balance and organization. Moreover, to do otherwise would involve reprinting step by step procedures which are already printed in the NATOPS manual for most aircraft, A-4 included. This is not to say that NATOPS procedures never need discussion or elaboration (or even changing) because they do.

The impetus for your letter may have come from our inclusion of the A-4 accident brief in our article. This was done with a view toward illustrating the *need for planning* and to stress the *critical nature* of the takeoff situation, not only in the A-4 but in all high performance aircraft. It was in no sense intended as a wrapup discussion of A-4 takeoff abort considerations. It seems appropriate to interject at this point that we regard the fleet as being the main repository of A-4 operational expertise, including the matter of takeoff aborts. Nevertheless, NavSafeCen has a function and a responsibility to focus attention on problem areas which have become apparent through reports received from the fleet.

As the aviation safety officer of a command which operates many A-4 aircraft your emphasis on the A-4 is understandable. Moreover, a review of the aircraft models involved in takeoff abort accidents during the

previous year shows that A-4 aircraft were involved in a goodly number of them. This leads us to the conclusion that it may indeed be worthwhile to address ourselves at this time to the points raised in your letter.

In general, we cannot agree with the implication that if better aircraft were provided the pilots would not have any takeoff accidents. Nor can we agree that it is dismal (and inexcusable) not to have runways long enough and/or aircraft powerful enough to allow a pilot to routinely commence a max gross weight takeoff, under

whatever conditions of field elevation and temperature which may happen to exist, accelerate to liftoff speed and then be able to abort by the use of aircraft brakes alone. We agree that such operating conditions would be very desirable and would be a definite safety factor but, considering the present state of the aviation art, it is something which cannot be demanded as a precondition to exerting our best efforts to operate in the safest manner possible. One of the best efforts we can put forth is recognition that under most operating conditions the go, no-go point is *not* going to be the same as the liftoff point and that *the go, no-go decision should not be delayed until that point.* Knowing this, the line speed check assumes increasing importance. If it is unsatisfactory the takeoff should never be continued in the expectation that the emergency abort gear will save the aircraft in the event it cannot get airborne. Notwithstanding these comments we do note that it is a rare operating base (or aircraft) which is not designed in such a manner that under ordinary circumstances an aircraft can commence a takeoff roll, reach liftoff speed and then be able to accomplish an abort using emergency arresting gear. We must emphasize, however, that we do not consider that this would be a routine operation under all conditions. On the contrary, there are many factors which could make it otherwise:

- *A blown tire.*
- *A tailwind component.*
- *Slow aircraft acceleration.*
- *Indecision on the part of the pilot.*
- *Etc.*

Now, as to the three specific points in your letter:

(1) *Required excess thrust:* Naval Air Test Center, Patuxent River, Technical Report No. FT-82R-67T dated 4 Dec 1967, describes takeoff tests results for the A-4E aircraft. These tests were conducted under conditions of relatively high temperatures. One of the specific conclusions of this test report is that "maximum gross weight field takeoffs at 25,200 lbs are satisfactory." The test report, of course, amplifies and qualifies this statement as well as the other conclusions contained therein. The point is the aircraft has been extensively tested for the takeoff weights used operationally and found to perform satisfactorily. This is not to say that there are not conditions where takeoff characteristics would be marginal or unsatisfactory. Two of the factors which could combine to make a takeoff at maximum gross weight marginal or unsatisfactory are high field elevation and extreme high temperature. The detrimental effects of these factors are well known and can promote severe takeoff problems not only in A-4 aircraft but in many other models of aircraft. The effects of these factors (high field elevation and high temperature) are such that in the most extreme conditions the excess thrust-to-weight ratio may be such that a minimum acceptable rate of climb of 800 ft per minute cannot be obtained. In these cases a longer runway may do little to improve takeoff and climbout performance due to the speed limitations on the nose gear and tire.

Therefore, in extreme environmental conditions the gross weight of the aircraft becomes a limiting factor.

Limiting the gross weight often involves complex operational considerations which can only be resolved by operational commanders who have the duty and responsibility for making operational decisions. These same comments are roughly applicable to A-7 operations or to the operation of any other aircraft which is being employed to its maximum capability in combat operations.

We could continue this discussion along these lines but instead we refer you to the February 1969 A-4 *"Crossfeed"* which contains a substantial discussion of A-4 takeoff considerations. We also refer you to the accompanying box which contains a summary of proposed NATOPS changes which have been submitted by NavSafeCen for consideration of the A-4 NATOPS Review Conference on 5 May 1969. (The conference should have been completed by the time this reaches print.)

In regard to your reference to the power of the A-4 and A-7, we note that there has been a substantial increase in the power for the A-4E and F aircraft over earlier A/B/C models. That is, the J52-P-6A and J52-P-8A engines installed in these aircraft provide 8500 and 9300 lbs of thrust, respectively, as compared to the 7700 lbs of thrust of the J65-W16 which is installed in A-4A/B/C aircraft. There is also an improved version of the J65 (the J65-W20 with 8400 lbs of thrust) which is already being retrofitted in some A-4Cs and hopefully will be installed in A-4B models at some future time. Moreover, the A-4M soon to be in production and scheduled for Marine Corps use will incorporate a J52-PW-408 engine developing 11,200 lbs thrust. As for the A-7, we commend to your reading the article entitled, "The *Corsair II* as I See It," by CDR James Hill, which appeared in the Nov 1968 issue of the *"U. S. Naval Institute Proceedings."*

(2) *Brakes:* The A-4A/B/C and some A-4E aircraft still have single-disc brakes which could be – and have been – improved upon. This is reflected by A-4 AFC 272 (thru Amend 3) which provides for improved landing gear wheels, brakes (dual-disc type) and master cylinders for A-4E aircraft. Many A-4E aircraft have already been retrofitted with the improved brakes. Production A-4F and TA-4F aircraft are delivered with the improved brakes. Because the dual-disc type brakes provide a substantial (more than 50 percent) increase in braking capacity over the single-disc brakes, it has been recommended that A-4A/B/C aircraft also be retrofitted. Action on this recommendation is pending.

(3) *Stores jettisoning:* As you must know, NATOPS does not mention the subject of jettisoning stores in connection with takeoff aborts; however, NATOPS does say that stores should not be jettisoned (when airborne) below the minimum safe fragmentation altitude. However, it appears that there are situations where it would be appropriate on takeoff. We refer you once

again to the February 1969 A-4 *"Crossfeed"* and to the accompanying box.

This brings us to the final point in your letter: NATOPS and the individual pilot.

Let us hope your view towards NATOPS isn't as negative as your letter indicates. The problem may lie in understanding what NATOPS is and is not. It is not intended as a guarantee against aircraft arriving in the fleet without deficiencies. You can be sure *many* people are trying to do that by other means. It is meant to enable us to live as safely as possible within the limitations of our existing hardware. We believe it is hard to argue with the precept for NATOPS, i.e., "it is a positive approach towards improving combat readiness and achieving a substantial reduction in the aircraft accident rate. Standardization, based on professional knowledge and experience, provides the basis for development of an efficient and sound operational procedure. The standardization program is not planned to stifle individual initiative but, rather, to aid the commanding officer in increasing the unit's combat potential without reducing his command prestige or responsibility."

As we said, it's hard to argue with words like this. Now it may be that NATOPS is not really being used to full effect at all times. That is, individuals may know a better way than NATOPS says. Or, NATOPS may not be complete enough. The answer appears to be not to forget NATOPS but to improve it in the areas where it is needed. We note that *anyone* in naval aviation is at liberty to propose a change to NATOPS. Só, if it doesn't set well with you as it is, get busy with those changes.

We'd like to quote from the emergency section of the A-4 NATOPS which says:

"It is likely that most emergencies will require some deviation from the procedure set forth for a simple failure because of varied conditions, i.e., compounded emergencies, facilities available, weather factors, etc. Consequently, throughtful analysis of each situation is necessary and the *selection of the course of action to be taken rests with the pilot."*

So you see, the pilot still has a lot of responsibility for the handling of emergencies and nowhere is this more true than in the case of A-4 takeoff emergencies.

As a parting shot (in the spirit of the game) we always considered that us "folks in the safety education business" include every ASO in the fleet. We'd like to keep thinking that way.

Sincerely,

The Editor

A-4 Series NATOPS changes pertaining to field takeoffs which have been proposed

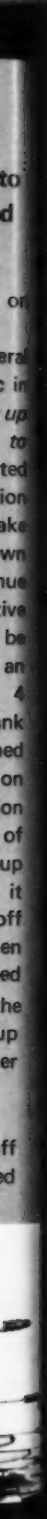
• *Applicable aircraft:* All A-4 models

Proposed change: Include information on flap-up takeoff distance requirements:

Justification: This would be good general information and might keep a pilot from panic in the following situations: *Flap creep toward the up position or flaps inadvertently left up prior to takeoff.* With either of these conditions suspected or verified by a glance at the flap position indicator during takeoff roll the pilot has to make a decision. He can attempt to place the flaps down (which may result in full flaps), abort or continue a no-flaps takeoff. Suprisingly, the last alternative does not require the extra runway that might be expected. A typical situation is presented as an example: A-4C, J-65-W16 configured with 4 Mk-82 Snakeye on TERs, 300 gal centerline tank for a takeoff gross weight of 20,000 lbs. Planned liftoff speed is 147 kts, requiring 5050 ft of roll on a 30°C day. The McDonnell-Douglas Corporation has supplied information showing a takeoff roll of 5450 ft would be required in the flaps-up configuration. Depending on runway available, it would appear that continuing a flaps-up takeoff would be preferable to the other alternatives when you are near liftoff speed. Tire limiting speed could enter the picture if the aircraft was kept on the deck longer than necessary; however, flap-up liftoff speed would be only about 10 kts higher than that planned for half flaps.

• *Applicable aircraft:* All A-4 models

Proposed change: Emphasize increasing liftoff speed in those situations wherein programmed



liftoff speed would result in marginal rates of climb.

Justification: Present NATOPS procedures call for liftoff "by the numbers" as computed from the charts. Why not utilize the extra runway to gain additional airspeed (above NATOPS computed liftoff speed) prior to takeoff in order to increase the rate of climb once airborne? Runway available for abort, abort gear availability/capability and tire limiting speeds would have to be considerations.

- *Applicable aircraft:* All A-4 models.

Proposed change: Emphasize in the emergency procedures section the jettison of stores in those situations where a successful takeoff becomes questionable. Recommend a short paragraph at the start of the "Takeoff Emergencies" section be included to read as follows: "Jettison of stores should be considered in those situations where a successful takeoff becomes questionable if continued in the present configuration." Such situations might include blown tires, loss of directional control where runway departure prior to arresting gear seems likely, flap creep, improper trim setting, etc. With a properly operating engine and airspeed at or above that required for liftoff in a clean configuration, stores should be jettisoned and takeoff continued.

Justification: From various AARs, incidents, etc., it is apparent that jettison of stores is not preached or, in some cases, even thought about as a means of increasing the chances of a safe takeoff in certain emergency or quasi-emergency situations. There have been a number of cases where partial loss of thrust (known or suspected), blown tires, loss of directional control, flap creep, improper trim setting or throttle creep brought about a situation where a successful takeoff became questionable. Some takeoffs were continued, some attempted aborts; however, in none of these instances did the pilot use emergency jettison to clean off the aircraft. This situation should be thoroughly discussed at the squadron level where all the factors are known, runway length, arresting gear and terrain beyond the runway. One area that might be of concern is whether to jettison certain ordnance loads while still on the runway. Certainly, once airborne, jettisoning should pose very little hazard compared to other possible consequences.

- *Applicable aircraft:* A-4F and TA-4F

Proposed change: Reduce crosswind limit for takeoff in the A-4F and TA-4F to that of non-spoiler equipped A-4 aircraft, i.e., 15 kts.

Justification: Spoilers are of no value during takeoff roll (unless an abort follows). Pilots are being lulled into a false sense of "crosswind immunity" during takeoff with the present limitation. There have been five major accidents involving spoiler equipped aircraft with loss of directional control in the past 14 months. Although crosswind was not a cause in all cases it was the significant factor in some where the pilot thought he was equipped to handle a crosswind of considerable velocity and found that he and/or the aircraft were not capable.

- *Applicable aircraft:* A-4 and TA-4F

Proposed change: Nosewheel steering not be used during takeoff as a normal procedure.

Justification: Should be no need. At high speeds, if nosewheel steering is used and wind gusts/swerves are encountered, full rudder deflection (a natural reaction by the pilot) would induce full throw of the nosewheel steering in addition. This might create a tipping action toward the direction of swerve.

- *Applicable aircraft:* A-4E

Proposed change: Change takeoff and landing distance data to format used in other A-4 PCL's.

Justification: For cross-country flight and those pilots not completely familiar with the aircraft (VRF, etc.), more precise data should be provided in the PCL. ◄

Aviation Safety in a Combat Zone

By LCDR James E. Brady

FINALLY I had made it. I had arrived where the action is. I was in Vietnam checking into the Navy's one and only helicopter attack squadron. This is something that I had looked forward to for a long time; it represented many months of planning, hoping and several phone calls.

During the check-in I found out, to my dismay, that I was to be the new aviation safety officer – again. Once more my past experience had caught up with me. One good thing about it was that I would relieve an old buddy. I rushed over to the aviation safety office to find John and to find out what the safety job was all about in a combat zone. I thought that surely the job would not require much paperwork and that I would merely be advising the skipper and the detachments on aviation safety matters in general. I finally found John in a little cubby hole magnanimously called an office. He wasn't the same John that I remembered. He looked as if he had aged long before his time. He had a strange reaction when I told him I was his relief. It took a full five minutes before he stopped laughing and jumping up and down. Battle fatigue I thought. Terrible what it will do to a man.

We each poured a cup of coffee and started talking

about old times. As my eyes took in the mass of paperwork I casually asked John what he was writing. His eyes got kind of a faraway look as he mumbled something about another accident report. Slightly dismayed I picked up some of his paper work to see what differences there were in a combat area report. I noticed immediately that there was a different numbering system or maybe John had made a mistake by using the roman numeral instead of arabic. I was about to point this out when a horrible thought struck me. Maybe that wasn't roman numeral II. No, that couldn't be possible – it was only April. I jokingly mentioned to John that I mistook the accident number for 11 instead of two. The strange look was still in his eyes as he confirmed my worst thoughts. "Eleven!" I gasped. John said something which sounded like, "Don't worry there are normally never more than two investigations going on at any one time." I must have looked pretty silly sitting there with my mouth hanging open. While I sat there in a state of shock John went even further and told me that 240 incidents occurred in the last six months. He sort of brushed it off by telling me that most of the incidents were DEA (direct enemy action) which was an easy report to prepare. With that I almost fainted.

About two weeks later John left for home looking almost as fresh and happy as I formerly remembered him. On the other hand I've noticed furrows across my forehead and new wrinkles around my eyes when I shave in the morning. I guess it's the climate and that my skin is drying out.

The skipper told me that he wanted a vigorous safety program so I launched into it with *vigah.* There were lots of little minor details to take care of – like painting smoking restriction signs on the line area which happens to be made of wet sandbags or painting rotor arc warnings on a deck of loose gravel. All in all my safety program had come along pretty well. There were some little rebellions now and then – like the night the maintenance gang painted "Safety Stinks" on my mirror. I guess they didn't like some of my memorandums. The squadron's accident-free hours were building nicely and I was feeling very proud (feeling it was only through my safety programs that such a thing could happen). Then it happened. I was halfway through my second beer before dinner, one evening, when I was called. Naturally it was one of those rare nights when steaks were on the menu. All the way down to the squadron I clung to the hope that it would just be an incident.

After listening on the squadron's tactical frequency for about three hours I had enough information for my preliminary message and enough information to know we'd had a bad one. Next morning I flew to the scene to conduct the investigation. An investigator's kit out here includes a few extra items like a pistol, one M-16 rifle and maybe a grenade or two. The VC have a strange theory that anything that falls into their territory belongs to them. I went to the crash site with a group of SEALS and some Vietnamese soldiers. I gained a new respect for the ground soldier that day and have held it since. The delta mud compares very favorably with quicksand. You're constantly up to your waist and always sinking deeper. One thing I learned was not to wear my leather flight boots in it. They create a suction that immobilizes you in the mud. The red ants and mosquitoes here are the hungriest in the world. To them insect repellent is like barbeque sauce on a steak.

An accident investigation at a remote site over here must be rather quick – by necessity. You also have to be as thorough as possible for usually there is no coming back later to recheck something. The Army salvage people do a tremendous job of getting out wreckage so sometimes you get a good chance to thoroughly investigate an accident but some of them are so broken that they can't be hooked out and there aren't any friendly forces to secure the area. That's when you have to go in quick, with a small group, recover what weapons you can, investigate as best you can while the SEALS plant explosives and then get out fast before "Charlie" comes snooping around.

A lot of guys ask me why I go into those sites. The answer to that is easy. It's my job. Actually, there is more to it than that (but that's a good enough reason) as in no other place that I've been, the pilots and crewmen here want to know *why* the accident happened. They also ask *how* it happened. More importantly they want to know *how it can be prevented.* That's why I wade through the mud. I want to find the answers to give them. Looking for and finding the answers is the job and the reward of any aviation safety officer, especially one in a combat zone. ◄

My First Flight Instructor

By CDR H. L. Fremd
Training Analyst
Naval Safety Center

I'LL NEVER forget my first flight instructor. He's the guy who was my guide on my very first trip away from the solidity, comfort *and safety* of Mother Earth. I still remember how, after we had cleared the field, he levelled off at a few thousand feet, trimmed the controls for level flight, took both hands off the controls for me to see how well the aircraft was trimmed and said, "Now you take the controls and fly it."

So I took the controls, as briefed, and then the fun began: A zoom and then a dive, up and down, like a roller coaster. It was thrilling. It was exciting. The only thing that worried me was that it was getting worse and the aircraft was also starting to roll off on one wing. About this time my instructor called and told me to release all controls. At the same time he pointed out that he still had his hands and feet off the controls. The aircraft settled down rapidly of its own accord; the up and down oscillations quickly dampened out and the aircraft was in a gentle right turn, descending ever so slowly. He called me and told me to keep my hands off the stick and to put in a little left rudder to pick up the right wing. When the wings were level he told me to get off the rudder which I did. Then he gave me my first verbal inflight instruction. He said, "The aircraft isn't hard to fly. Right now it's flying pretty well by itself. Of course, sooner or later, it's going to get out of the desired flight condition and you'll have to control it if you want to stay straight and level or if you want to climb, descend, turn, etc. The point of this demonstration is to show you that while the pilot has to fly the aircraft, he has to do it with finesse." Then he added, "Let's try it again. Only this time we're going to be smoother. This time I want you to put your right elbow on your right knee, then hold the stick very lightly, using only your thumb on one side and your forefinger and index finger on the other side. When you want to move the stick one way or the other do it by wrist action. This will enable you to smoothly manipulate the controls. Later on you will develop the coordination and finesse to move the controls in the way and in the amounts you want, even though you may be gripping the controls quite firmly.

"All this shows you that you don't have to roughly overpower the aircraft. Most of the time you only need to guide it with fine adjustments."

Well, it was some time before this lesson took full effect – about the middle of advance training I think, but he had a good point and I soon understood what he was talking about even though I had not yet mastered the aircraft.

This is one of my good memories. I have some of the other kind, too. I remember later on takeoff and climbout from home field he rode me mercilessly about airspeed control. He kept saying in that calm but ever so

firm voice, "Airspeed! Airspeed!" and continued to do so until I hated the word. I felt sorry for myself. I thought, "I'm just learning to fly and I'm only 5 kts off airspeed. I think it's unreasonable for him to ride me like this about 5 kts of airspeed when I'm just learning. I'll bet he can't keep his car within 5 miles of a set speed – and he's been driving for years."

Well, this went on for a couple of days until I decided that the only way to get him off my back was to climb out at 100 kts and not at 95 to 105 kts. So I did it. But then it wasn't long before he was on my back again about something else.

After about 10 flights, I began to feel pretty good – maybe too good! My instructor still rode me about things from time to time. Maybe it was nothing more than insisting that a certain procedure be performed *exactly* right at *exactly* the right time – but he still managed to find one or two things on every flight which he would uncompromisingly insist I perform exactly right. Mostly he would gently correct me on one point or another as we went through the routines of stalls, acrobatics and landings. So, as I said, after about 10 flights I was feeling pretty good. Maybe I was feeling even a little like I was a hot pilot. I know I never overlooked any opportunity to tell my fellow students how well my instructor apparently regarded my progress.

Then came the rude awakening. Suddenly my primary flight instuctor turned into a . . . . well, I guess the word "devil" will have to suffice.

On the climbout he growled at me for being off airspeed – by 3 kts, mind you. Then, before I could adjust my nose position, he sarcastically inquired if I intended to wait until we were over the paper mill before turning to our climbout heading. And that's the way the whole flight went. My stalls were atrocious, so he said. And when it came time for landing practice everything really went to hell. On initial for the standard field entry he commented unfavorably about my turn-in point. He always seemed to demand I do something *just* before I was ready to do it. On the descent to pattern altitude he wanted the power back, the gear and flaps down,etc. – *just* before I got around to doing it. On the climbout after a touch-and-go he roughly yanked the power back, slapped the nose down to a level position and bluntly noted that a little more and we would have "busted" the altitude reserved for initial entry.

Finally I could no longer contain my resentment. And in a burst of anger I told him what I thought of his unreasonable attitude, emphasizing that I was just learning to fly. His response surprised me. He took the controls and told me to relax; we left the pattern. He then took me on a guided tour of the local flying area, pointing out a place here, a place there, asking a casual question now and then. Whenever I indicated a lack of recognition about our position or about landmarks he took pains to orient me. Before we returned to home field I was feeling pretty good again. My instructor once again seemed like the old philosopher and friend.

As we approached the entry channel he told me to take the aircraft again. He also told me that he wanted me to show him a good entry – and flight – all the way to shutdown in the chocks. I didn't disappoint him.

Afterwards, as we debriefed over a cup of coffee he mentioned that I'd soon be up for my solo flight check. He mentioned the next flight and told me that before he put me up for a check ride I would have to show him (on my next flight) that I was ready.

I gave his statement (and his actions on the just completed flight) a lot of thought. And I gave my procedures a lot of study the rest of the day and that night because I understood what he was talking about. If I wanted to be put up for a safe for solo check I had to be ready – friendship notwithstanding. So I was ready and I *was* put up for my check.

Now, some years later, I still remember my primary flight instructor with respect. And, though I had many other instructors during training and since, I think it was my primary instructor more than any other who gave me an outlook on flying which I still have.

He showed me many things. He let me know that, even though he was on his third or fourth flight of the day, he still had the time and the energy to demand the best from me. He had the time to constructively criticize and he had the motivation to demonstrate one more loop for my benefit even though it may have been his 20th loop of the day. Just so I would learn not to drop a wing, even by 10 degrees! He wanted me to be good, precise, professional.

He wasn't a big man. Nor was his bearing overly impressive. But, in retrospect, *he* was impressive. His handling of the matter of safety is a good example. He never regarded it as separate and apart from the business of flying skills and procedures. He seldom ever threatened me with death and destruction from above if I did not comply with safety rules. No, he was more of a demonstrator. He showed the way. For instance the time the tower cleared us for "immediate takeoff," to "expedite." He calmly called the tower and asked to clear the duty since we weren't really ready to "expedite." He told me, "Never let anyone or anything rush you into an ill-prepared flight."

And he demonstrated that course rules were something to live by as far as he was concerned. If we were supposed to pass a point at 1/2 wingtip distance in the entry to home field he didn't mind telling me that

3/4th wingtip distance or even 5/8th wingtip distance wouldn't do.

Now, years later, I'm an experienced pilot in the Fleet. I often wonder what happened to my primary flight instructor. Was he recognized, promoted and otherwise rewarded for the professional naval aviator he was?

Every day I see and fly with nuggets. Most of them are professional, if relatively inexperienced, aviators. Every now and then, though, I see one of them in one of the local squadrons doing something that falls a little bit short of being professional. Maybe it is a very high speed break, a wrapped up approach, an S-turn in the groove, a landing 10 kts above the optimum – but whatever it is, I often wonder what kind of guy he had for a primary flight instructor. Indeed, I wonder what kind of instructors he had, on the average, throughout the flight training program. Sometimes, too, I wonder what the Navy thinks of flight instructors as career naval officers.

I'm thinking about this now, especially, because I'll soon be up for orders and I'm wondering whether to make a pitch for an extended tour of Fleet duty, whether to try to get some good staff duty – or whether to put my Fleet training and experience – and my love of flying – to work motivating student naval aviators to take the professional approach, not only to flying but to a career as a naval officer.

I'm wondering about this partly because I like to think I am a professional both from a flying point of view and from a career-as-a-naval-officer point of view. And, frankly, I'm wondering about whether a request for instructor duty, however personally satisfying it may be to train and motivate young officers and students, will be in my best career interests.

I don't have the complete answer right now. But, one day soon I am going to have to make my decision on what duty to push for next. I can only hope by that time the answers to my musings will be more apparent.

Comment

The naval flight instructor's role encompasses more than merely teaching a student to apply academic principles with motor skills thereby manipulating flight controls. There is another equally important factor which has a definite bearing on naval aviation safety. We speak of a student's attitude toward flying. If we recognize that this attitude is important we must also recognize that the naval flight instructor is a very important factor in the molding of attitudes among naval aviators. He is often the very first naval officer with whom a student becomes closely associated after entering the Navy. Excepting a relatively small input of officers from the Fleet almost every student naval aviator is delivered to the care of his primary flight instructor after only a few short months in the Navy, a large part of which has been spent undergoing academic instruction. Knowing that his instructor has been assigned to the training command after a tour of sea duty or other operational duty it's only logical that this young student is going to form an opinion or attitude about Navy life and naval aviation safety based in large part on the example of his flight instructor.

It has been said that "Safety is a state of mind." To develop this state of mind is to achieve true professionalism in naval aviation. To encompass each of the daily flight functions with the thought of safety in order to instill the habit of safety in each student's life should be the goal of the flight instructor. The flight instructor must *show* the way to safety, not by word alone but by deed; knowing and showing the safe way to live, work and fly. Teaching the student to use the tools of safety such as NATOPS, proper preparation and good personal habits are the marks of truly professional naval aviators.

Thus, the naval flight instructor is – and always has been – the keystone of the structure which is called *naval aviation.* From the days of bailing wire and bamboo struts to the era of Mach 3 – and beyond into space – the men who taught and now teach other men in the Navy and Marine Corps the how, the why and the wherefore of coping with Newton's Law should be held in high esteem. As far as career enhancement is concerned, the most casual review of the duty assignments of our past and present Navy and Marine Corps leaders will reveal that a very large percentage at one time or another "pulled instructor duty." That fact should speak for itself. So, here's to the instructor – long may he flourish!

The following letter was borrowed from the Royal Navy's air safety magazine *Cockpit*. The editor explained that the likes of this correspondent is one of the reasons for the safety magazine's existence. Our editors view it as having a degree of commonality for APPROACH.

Why Safety Magazines?

Somewhere in Scotland

Sir,

I have the honour to report the reasons why I overran the runway in *Seahawk* WV 814 and destroyed part of the golf course.

I was briefed by Lieutenant . . . . . and walked out to my aircraft. The before flight checks were normal, all ground locks being in place, so I entered the cockpit. I completed my prestart checks and got a signal from the line chief who was running towards my aircraft, whereupon I started up.

The exhaust blanks blew off quite easily, the rest of the start being normal, the wings unfolding as the RPM built up. The pilot's mate gave me the signal to increase RPM for the tank check and climbed onto the wing. I added power. As the aircraft moved forward I saw the pilot's mate sliding back. I stopped. The pilot's mate passed me giving me a thumbs-up and another signal upon which I was not briefed. Accordingly, I waved away the chocks and acknowledged the greeting of the C.O. who had run out to see me off.

Calling for taxi clearance, I left dispersal. Getting no reply from the tower I assumed that I was in a blind spot and I headed for the duty runway. Since we were on the short runway I elected to use takeoff flaps which I selected. Up until now everything was normal.

As I added power to take off I noted that the wind sock was unsafe and in actual fact was 180 out. Making a mental note I checked my gages, everything was normal.

At 160 kts I raised my nosewheel and became airborne. Throttling back to avoid exceeding the undercarriage limit I raised my flaps. Adding full power I became airborne again. I then selected undercarriage up. Nothing happened.

Remembering my briefing I rolled inverted to reselect. I was unable to read the transmission from the tower. My undercarriage remained down and I elected to burn off fuel and land.

At 300 lbs I called for join, giving my state. There was no reply. At this stage I noticed all the crash wagons on the standby runway. I assumed that there was an emergency landing in progress. I called breaking and broke. Applying full opposite rudder and moving the stick progressively forward I called downwind, low level. The undercarriage was already down so there was nothing to worry about. Throttling back to 12,400 I called finals all green. A series of red verys rather distracted me. However, the first time I landed I was on the runway. The wind down the runway must have been very strong since my ASI still read 180 kts.

I landed again and commenced braking. I then passed over an extremely rough patch of runway.

Passing the fourth green I was rather alarmed to notice someone driving off. Ducking my head to avoid being hit by the ball I crossed the main road narrowly missing several vehicles – fire engines I think. I noted the time to report the incident when I returned.

Eventually the aircraft stopped and I opened the canopy and stepped out. Swimming rapidly to the surface, I inflated my dinghy. Swimming after my dinghy my parachute rip cord caught on an obstruction opening the parachute. Passing the lighthouse I overtook the chopper. I was rescued and returned to sign in.

I had the honour to be,

Sir

Your obedient Servant.

CENSORED (Ed.)

P.S. Please address any further communications to me at: Central Flying School, Little Risington, my new appointment. ◄

With the advent of the June to November hurricane season, all hands are well-advised to consider the need for HurEvac preparation and planning.

The article which follows is an Anymouse report, reprinted from the January 1965 APPROACH. In spite of it's wry humor and obvious spirit of exaggeration, we hope it will serve to remind all concerned that mass evacuation of aircraft requires planning, coordination and many, many cool heads. Now is the time to anticipate.

HurEvac

Two words about a HurEvac – *don't go!* You might assume the duty, go on leave, get grounded or take charge of operations and send someone else but don't *you* go!

Having given you this valuable advice, I now must defend its value. To do this I will describe a HurEvac in which I took part recently. It was well planned. All pilots were briefed. Everyone knew exactly what to do. The operation was a complete fiasco.

That was the big picture; now for the details. I was stationed in the Pensacola area, instructing in the T-28. It was a typical midsummer day in the Training Command – hot, humid, miserable. Summer in Florida also means hurricane season. The weather bureau keeps an eye on all tropical storms and keeps the Gulf Coast prewarned of them. From these warnings the Training Command sets HurEvac conditions for all squadrons. HurEvac Condition III is set 24 hours prior to HurEvac. This is the time to evacuate.

A HurEvac sounded like fun, sitting around for a couple of days just eating, sleeping and playing cards. Anything seemed better than four hops a day. So the stage was set. The warning came, and at 0430 we assembled for the launch brief. We had been prebriefed several times on where we were going, formations to use, etc. All we needed now was plane assignments and frequencies. The squadron had 120 aircraft without hangar space. There were 110 instructors, 20 of which quickly found reasons not to go. No problem – 30

qualified students to fill the gap.

At 1230 the operations officer plus seven launched for NAS Memphis. We were on our way. And every 5 minutes for the next 90 minutes eight more T-28s lifted off. The great "adventure" spirit was everywhere.

I was in the last flight and was airborne about 1400. The weather was marginal VFR with a thin broken layer around 1700 ft. We were to stay underneath the weather if at all possible. Terminal weather was forecast to be no problem in Memphis. Everything was still smooth and on schedule – 300 miles of T-28s burning 25,000 lbs of fuel an hour.

Our flight was average. Two experienced division leaders, five instructors with no recent formation experience and a formation student. The student had no problem; the rest of us found a comfortable parade position after 15 minutes or so. About this time the first flight was touching down at NAS Memphis. Another hour and we would all be closed out. It was to be a long hour.

We were not outrunning the weather. The ceiling, still broken, was down to 1200 ft. Visibility was poor with light showers. At this point we took the upper route, still expecting good weather at Memphis. Our armada was now in three groups: 1/3 on deck, 1/3 approaching low level and 1/3 on top.

At this point Memphis reported IFR with field weather 900 ft broken. The lower group commenced contact approaches. The upper group started saturating all available holding space. Radar monitoring was impossible. Communication was hopeless. Still, everyone had plenty of fuel and we were VFR. We could even see the field from time to time. A short delay, an hour at the most, we figured.

Unfortunately, we were not the only group heading for Memphis. NAS Pensacola sent an assorted group of T-2As, T-28s, C-45s and a UF. Saufley Field added a few T-34s and a dozen T-28s. Tyndall AFB was represented by 20 F-102s with 20 to 30 minutes' fuel remaining. Somehow we all squeezed in and awaited instructions. By this time all of the lower traffic was on the deck and the actual approaches started.

Photo of the eye of hurrican Gracie taken by CDR Hill, VFP-62, from an F8U-1P on September 28, 1959.

There was quite a delay in getting organized and the jets started calling "low fuel." This started it. Now everybody had a problem – more radio confusion – Navy versus Air Force, jets versus props, everybody versus Memphis Approach Control. The jets had to come down and two by two they were cleared in. It was now 1630 and the '28 drivers were tired and ragged. With the jets in, the props started in, two at a time. There were some strange formations. A UF joined on a *Beechcraft*. Another *Beechcraft* joined a T-34. So far no T-28 from our group had started in.

Fuel now became a problem for everyone. Low fuel state became the only way to get a clearance. When this stopped working a few declared emergencies. We were still spectators. There were now four aircraft in the emergency pattern. One conversation between an F-102 and Memphis Approach was as follows:

"Memphis Approach, Air Force jet 309, low fuel state."

"Air Force jet 309, Memphis Approach, Roger, Standby."

(A few minutes later.) "Memphis Approach, Air Force 309, 4 minutes fuel remaining."

"Air Force 309, Memphis Approach, Roger, Standby."

(Exactly four minutes later.) "Memphis Approach, Air Force jet 309, commencing flameout approach." He made the runway and rolled by several T-28s like they were standing still.

A student landed a T-28 with high oil temperature and zero oil pressure. At the line they couldn't find a trace of oil. One by one the emergencies were landed and it was all over but the shouting.

Everyone should have been issued a campaign medal. The Memphis Approach controllers should have received the Presidental Citation, simply because everyone made it. It was luck! It was a modern miracle!

As I taxied in and shut down my feelings were unexplainable. I was dead tired. I was elated. I wanted to kill an Air Force pilot. I found one and instead we got drunk together. It was no use trying to tell anyone the problems you had getting in. The first liar didn't have a chance. A tape recording would have overwhelmed the Anymouse Editor.

The hurricane hit Corpus Christi, Texas, 700 miles away. This was the final blow to our great "adventure" spirit – never again! ◄

FROZEN TRIM

THE trusty old C-54 sat out in the open for several days and nights in a recent California deluge.

After finally getting everything dry enough to check out, we went to NAS Twin Towns where it was a cool -12^0 F.

The stop at NAS Twin Towns was a short one so the pretakeoff checks were abbreviated but supposedly the essentials were covered. After level-off the copilot tried to make a small change in the rudder trim but, lo and behold, the rudder trim was frozen in place. It thawed loose a couple of hundred miles farther south.

I wonder what would have happened if we'd lost an engine or two on one side and tried to return to the field at weather minimums and ZERO trim?

Trim Mouse

Your letter focuses attention on a potential hazard of cold weather flying. Water freezing in flight has been known to cause trim problems, control problems and landing gear problems. However, it is conjecture, we believe, to attribute this particular problem to the California deluge which you mention. One thing we don't need to guess about, though, is the proven need for an adequate preflight check of the aircraft regardless of the weather and regardless of whether it is a home field takeoff or a takeoff from a field enroute.

NAS South

WE arrived at NAS South at 2100, scheduled for a passenger stop with immediate departure to NAS Halfway for RON to pick up a Code 5 early the following morning. We noticed a hydraulic leak which necessitated a brake change. Absolutely no "bunk" space was available in the area, BOQ or otherwise. It is now 0230 in the morning and the station maintenance crew continues to struggle to get the tire back on. If they get it back on we will arrive at NAS Halfway in time to get 1-2 hours' sleep prior to a 3 hour flight. Is this any way to run an airline?

Why don't air stations have the responsibility of providing *all* the

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

services to transients which are necessary to assure an adequately prepared flight at take off from them? Or is an alert crew considered superfluous nowadays?

Recommend

1. Require the BOQ officer to have a reasonable number of bunks available to cover such contingencies possibly requiring ODO approval for admittance.

2. Have a "bunk" area somewhere on the station, e.g. in the enlisted barracks, operations store room, WAVE barracks, anywhere!!!

3. Have air mattresses and blankets available for issue. "We" used to sleep under the wings of our *Spads* but these concrete mats are not as soft as the hayfields of yesteryear.

Sleepy Mouse

The air station in question here does not advertise that quarters are not available. It is not known if a NOTAM was in effect imposing such a limitation at the time or how far beyond the BOQ desk the aircraft commander went.

One point does emerge here, however. The safety of the crew and the passengers they carry is affected by the amount of sleep they get. To this end the aircraft commander must be prepared to push his requirements as far past the BOQ desk as he feels necessary. The BOQ officer, operations duty officers and/or the command duty officer must be prepared to lend all possible assistance.

Clear the Runway – and Carry Your Tail Behind You

ON a night GCA rollout in an A-4C, approximately 1000 ft from the end of the runway, I noticed a large object moving off the runway on the right and ahead of me. Quickly I jammed on the brakes, stopped and flicked on my taxi lights. There in front of me was a drag chute from an F-4 which had turned off the runway early (1000 ft remaining) and stopped just over the runway boundary. The drag chute, however, was blown into my path by the F-4's exhaust. The tower had cleared me to land so the F-4 had called "Off the duty" – but his chute wasn't "off the duty."

The runway in use was 10,000 ft long – any less and I might have needed that extra 1000 ft to stop.

Recommendation: All rollouts at night should be to the end of the runway and all pilots using drag chutes should be aware of their location at all times.

Anymouse

Thank you for your report. Pilots of drag chute equipped aircraft take heed!

NATOPS

WHILE on a recent trip I had the opportunity to attend a brief given by a unit aboard a carrier. As I understood the briefing, it was pointed out to pilots that if they were told to do something over the radio that was in violation of NATOPS they were not to mention or imply that the subject order/directive was in violation of NATOPS in their response. If in fact a pilot did tell the ship that the directive was in violation of NATOPS the pilots were given to understand that they could be sure to make the bridge their first stop upon shutting down.

It appears this procedure would keep the pilot off the record/tape for having brought out a bad situation and leave him open for a *pilot factor* mishap when actually it should be *supervisory error.*

Recommend that attention be placed on educating all carriers on the point that *safety* and NATOPS will increase combat effectiveness.

Anymouse

Let's hope you misunderstood the brief! Discussions of NATOPS, as related to tactical doctrine, are best held on the deck rather than while airborne and operating. The NATOPS program is a positive approach toward improving combat readiness and achieving a substantial reduction in the aircraft accident rate. Standardization based on professional knowledge and experience provides the basis of an efficient and sound operational procedure.

NATOPS standardizes ground and flight procedures but does not include tactical doctrine. Compliance with the stipulated NATOPS manual procedures is mandatory except as authorized in each NATOPS manual promulgating directive.

Although it is conceivable that in a combat environment military exigency may justify one time deviations from instructions and procedures contained in NATOPS, the NATOPS program depends in large measure upon the active support of all hands in naval aviation.

Finally, in order for the NATOPS program to be effective it must be dynamic; it should stimulate rather than suppress individual thinking. Furthermore, it should be considered as an aid by commanding officers in increasing their unit's combat potential.

NATOPS is a program which deserves the support of all levels. If specific aspects of it don't fill the bill, let's take the time to submit appropriate changes.

An Artistic Appr

By LCDR A. E. Wesleskey

"All hands on deck for an Art Show!"

How does that sound coming from the Squadron Skipper?

While looking for potential hazards during a recent Safety Survey, the C.O. and Aviation Safety Officer of HS-1 observed some talented doodles and art work by squadron personnel. A new approach to the aviation safety program was born when the Skipper announced a contest which would permit the personnel to display their talents. The only criteria set forth concerning the art show was that all entries had to relate to industrial or aviation SAFETY. What a way to conduct a safety survey – have all hands take a look around their own shop space and working areas and then illustrate or portray local safety hazards, slogans and ideas!

The initial reaction was one of mixed comments:

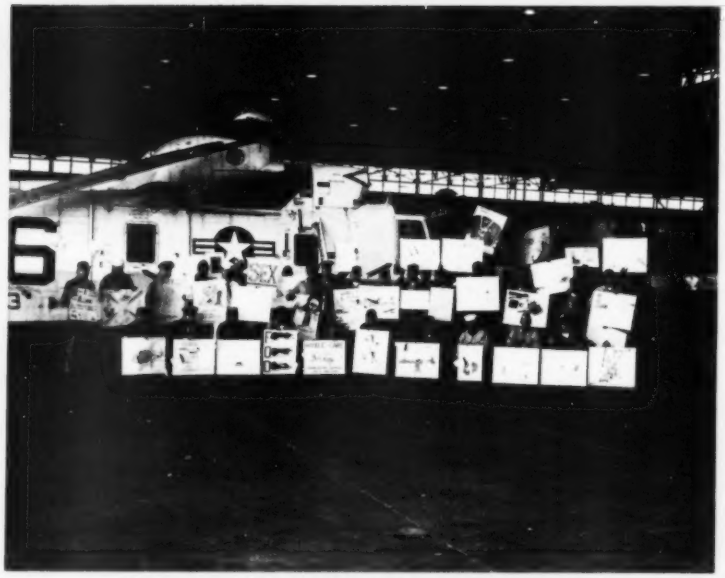
"It'll never get off the ground."

"How are you going to put it over?"

"What rewards or prizes will be offered?"

"Sounds great – Let's try it!"

"I can't draw but have an idea."



All hands participated in HS-1's safety poster competition.

"I can draw but haven't any inspiration."

With all this in mind the entire program was set into motion by the Safety Officer who selected an enlisted art committee augmented by the Public Affairs Officer. A date for the show was set as "one month hence." Basic art material would be provided, i.e. broad tip felt color pens and poster board. Four days prior to judging all entries would be submitted for entry and appropriate display. The display area was selected as the hangar door. Judges were the Commander, Carrier Anti-Submarine Air Group FIFTY (CVSG-50), the Commanding Officer of HS-1, the COMFAIR

ach to Safety

Key West Safety Officer and the HS-1 Aviation Safety Officer. Prizes; well, that became a real challenge. To make the contest attractive and give everyone a reasonable chance to win, 10 prizes were selected. They consisted of:

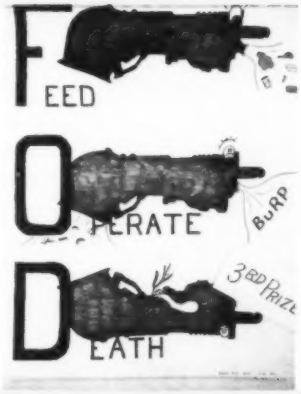
Three (3) 72-hour passes
Two (2) 48-hour passes
Two (2) $25 Savings Bonds
Three (3) dinners for two at a well known local restaurant.

Publications of the prizes and general rules via the Plan of the Day initially got out the word. A few prominently displayed samples of local poster work around maintenance spaces and the operations office gave examples to the crew. To ensure that participation wouldn't slip or be left until the last moment, the ASO visited each work center, shop area and office to encourage contestants with their entries. Men who had ideas got together with squadron artists to produce posters that fit most of the squadron's daily functions. From each shop came at least one entry until the Safety Officer had over 40 posters on his desk. The overall response was overwhelming to the judges and the squadron when Contest Day arrived.

Ground safety counts, too.

Perhaps this was an artistic approach to safety but it proved to be one of the most effective means to get everyone to look around and survey their environment. And let's face it – safety is an ART!

Due to space limitations APPROACH regrets it is unable to reprint all of the posters submitted; however, we extend a hearty well done to all hands who participated in the unique idea for safety promotion. ◄



ILLNESS

"As soon as my canopy was opened I began to feel much better but I was still very weak. I don't know whether I shut my engine down, or when it happened but my next conscious thought was amusement at someone touching my harness fasteners and burning his finger."

When all this took place, the A-4 pilot in our story was back on the ground safe and sound. If the hand of fate had rearranged events even a fraction, however, the results of his heat illness could have been entirely different. Continued

THE flight began normally from "X" Air Force Base at 1150 as the final leg of a cross-country, to cruise at FL 350, execute a practice tacan penetration to NAS "Y" and proceed VFR to home base. The training pilot was to lead with the subject of our story flying chase.

On the leg the night before, pressurization in the chase *Skyhawk* had been intermittently cycling plus or minus 2100 ft cabin altitude – a minor annoyance. During the first hour and 55 minutes of the flight at FL 330, pressurization and air conditioner worked normally. On the descent penetration, the pilot turned up the cabin heat to prevent canopy frost. While the aircraft were carrying out the rather lengthy tracking/arcing procedure at 2500 ft during the approach, he tried to select a lower cabin temperature but without result. Looking back on it he believes that in repeatedly turning the temperature switch between COLD and MANUAL HOT to obtain a lower temperature, the system became stuck in MANUAL HOT although at the time he did not notice it because of the lower power setting and heater output.

Blast of Hot Air

"Upon adding power after the low approach," the pilot reported later, "I got a blast of very hot air in my face." He also observed that he was perspiring excessively.

Immediately he shut down the eyeball vents, moved the canopy air to DECREASE and continued climbing in the hope that at altitude the cold air would alleviate the heat of the cockpit. This was not the case. Upon reaching FL 190 he realized it was "going to get very hot very fast" so he took the lead, descended to 8000 ft and selected ram air on level off. At this time he noticed that the cabin pressure did not dump and the cabin altimeter read 1000-2000 ft. He was about 40 miles from destination. Calling the tower, he declared an emergency and at the same time added power to 96 percent thinking that the faster he could land, the better. At some time during this period rapid mental deterioration began.

Requests Morest

At about 20 miles out he began to have trouble keeping his eyes open because they felt hot and dry. He requested a morest but was unable to compute his morest weight and speed. In the meantime he had stopped perspiring and had become quite dry. When he made a sharp left turn he continued the angle of bank to the point where the training pilot had to tell him to drop his wing which he then did.

"At about 15 miles I reduced power, put speedbrakes out and lowered gear, flaps and hook but my memory of events after this is somewhat vague," he says. "I had planned earlier to jettison my canopy as soon as I got slowed up but instead I began concentrating on airspeed and lineup and didn't think of the canopy again."

The landing was made without incident. After taking the gear, he wanted to raise flaps and hook and open the canopy but he was unable to move his limbs. Finally, he managed to grasp the canopy lever but he couldn't move it.

When the crash crew opened the canopy and shut down the engine, the pilot was still not perspiring; his flight suit was dry. He was rushed by ambulance to the station dispensary. His face was flushed, his skin was hot and dry and his voice was tremulous but his temperature (rectal) was only very slightly elevated. Although his mental processes were slow, he answered questions correctly and was oriented. His recovery was rapid and he was released to go home and grounded for 36 hours for rest and rehydration.

Cause of Trouble

The cause of all this trouble was failure of the cabin pressure relief valve and suspected failure of the cabin temperature/sensing element. Initial maintenance efforts to find the heat malfunction were without results; the unit was successfully cycled through its full spectrum of operation. Three days later the sensing element and control switch were changed when the malfunction occurred again.

It is possible that if the pilot had held the heat control switch in MANUAL COLD for the eight seconds required for the system to go to FULL COLD, cooling air might have been forthcoming, the squadron C.O. states. Although using a lower power setting in his descent to base would have meant a slightly longer time airborne it would also have tended to decrease the temperature within the cockpit.

"Earlier the pilot had decided as a last resort to jettison the canopy in accordance with A-4 NATOPS,"

the C.O. wrote in his report, "but the insidious onset of overheating clouded his judgement and he failed to do so.[1] It should be stressed to all pilots that this gradual weakening of physical and mental abilities by overheating is a potential killer. The decision and act of canopy jettison should be done before a pilot is so incapacitated that he can no longer function effectively or safely."

The squadron is submitting a NATOPS change recommending that the lowest power setting required for flight be maintained in the event of heat control failure in FULL HOT.

Flight Surgeon Comments

The investigating flight surgeon recommends wide dissemination of the fact that runaway cabin heat can be potentially every bit as dangerous and insidious as hypoxia. Although the pilot was aware of the heat he thought of the problem in terms of discomfort rather than as a threat to his mental functions.

"This was obviously wrong and almost resulted in a tragedy," the flight surgeon states. "Special emphasis should be put on the time involved. It does not take very long in such adverse conditions for mentation to deteriorate – in this case we estimate about 25 minutes, the last 10 of which were marked by pretty rapid decline."

[1]The A-4 NATOPS Manual, as of the time of this incident, stated: "If the manual temperature is inoperative and the pilot becomes uncomfortably hot or cold, the NORMAL/RAM switch should be turned to RAM. If it is not practical to operate in RAM, adjusting the eyeball diffusers and defrost control to minimize airflow, or changing altitude, should extend the period the adverse temperature can be endured. Land before debilitating effects reduce the pilot's capability to do so safely. If the cockpit temperature is unbearable and the pilot is unable to switch to RAM operation, the canopy should be jettisoned as a last resort if this would improve the situation."

Hot Environments

Although a case of heat illness in flight such as the one just described is relatively rare, heat is part of the working environment in many areas, both ashore and aboard ship. Cockpits and cabins of aircraft in the broiling sun become like ovens for pilots and crews awaiting takeoff. Ground crews working in the sun any time of year in tropic or semitropic areas or during the summer months in normally cooler parts of ConUS can encounter very high temperatures and humidity. Aboard ship, men working in such compartments as the bridle arrestor room, the aviation gasoline pump rooms or the arresting gear engine compartments have to adapt to hot working conditions.

For the benefit of readers to whom heat injury is a potential hazard and for those who have the responsibility for the well-being of such persons, here is a simplified discussion of the three main kinds of heat injury symptoms, their treatment and some preventive measures.[2] It should be emphasized that especially in the case of heatstroke, prompt professional medical treatment is essential for recovery. Your squadron flight surgeon or shipboard medical personnel can answer any questions which might arise in your mind as a result of this article as well as elaborate on the basic material offered here.

Three Categories of Heat Injury

Generally speaking, there are three categories of heat injury: 1) heat cramps, 2) heat exhaustion or heat prostration and 3) heatstroke. In heat cramps depletion of sodium chloride (salt) and water due to excessive sweating is a primary factor. In heat prostration the heat-dissipating mechanisms of the body are overactive. In heatstroke they are completely overwhelmed.

Heat Cramps

As stated above, heat cramps result primarily from excessive loss of salt from the body following exposure to heat. These cramps are painful, sometimes very severe and usually involve the muscles of the extremities and the abdominal wall. Body temperature is normal.

Heat cramps are promptly relieved by replacing the salt lost from the body. Saline solution (0.1 percent) by mouth or intravenous physiological saline solution should be administered. A 0.1 percent saline solution is prepared by dissolving two 10 grain plain salt tablets in a quart of water or adding one-fourth teaspoonful of table salt to a quart of water.

Continued

[2]Material in the following discussion is drawn from BuMedInst 6200.7, Heat Casualties; prevention of, and TB Med 175, The Etiology, Prevention, Diagnosis and Treatment of Adverse Effects of Heat. A new TB Med 175 is to be distributed this summer.

Heat Exhaustion

Heat exhaustion occurs under conditions of heat stress as the result of excessive loss of water and salt from the body. The mortality rate is extremely low and, as a rule, the removal of the patient to a cool environment, rest and the administration of salt solution will result in a prompt recovery.

Symptoms of heat exhaustion are headache, mental confusion, vertigo, lack of coordination, drowsiness, extreme weakness, loss of appetite, dizziness, visual disturbances and nausea or vomiting. Occasionally cramps of the extremities or abdominal muscles occur. The victim rarely loses consciousness. His skin is usually cool and he perspires profusely. Oral temperature may be subnormal or slightly elevated but the rectal temperature is usually elevated. Pulse rate is rapid (140 to 200 per minute) and the blood pressure may be lowered.

The individual should be removed to a cool place where he can rest. Any factor that promotes the return of blood to the heart will tend to relieve heat exhaustion; elevation of the feet and moving or massaging the extremities are helpful. The deficit of water and salt should be made up by the administration of large quantities of salt solution (0.1 percent saline solution) by mouth as freely as the patient will take it. If water is not available, salt tablets or salt in other forms should *not* be administered alone. In the presence of severe collapse, medical personnel should administer physiological saline solution intravenously.

Heatstroke

Heatstroke is a very serious condition with a high mortality rate. It is characterized by extremely high body temperature, usually with profound coma.

The development of heatstroke represents a breakdown of the body's heat regulating mechanism and is particularly apt to occur in individuals who are not acclimatized to heat. Physical exertion, alcoholism and diarrhea may predispose to the development of heat stroke.

After the disturbance of the heat-regulating mechanism occurs the individual may absorb heat from the ground or the surrounding air. In the great majority of cases there is absence of sweating indicating that failure of the sweating mechanism is at least partially responsible for the high body temperature. In other cases the skin surfaces are cool, suggesting that the main defect is in the transport of heat to the body surface as a result of circulatory deficiency.

During the early stages of heatstroke, after sweating has stopped and the temperature has risen, the individual may be exhilarated and unaware of the dangerous condition which is developing.

Symptoms of Heatstroke

Warning symptoms of heatstroke are headache, dizziness, mental confusion, weakness, nausea, urination and diminished or absent sweating. Usually, however, the onset of heatstroke occurs with dramatic suddenness with collapse and loss of consciousness. Profound coma is usually present and convulsions may occur. In the early stage the patient's skin is usually hot, red and dry and there is absence of sweating. Pulse is full and rapid and blood pressure is normal or elevated. Respirations are rapid and deep. The temperature is usually markedly elevated – in excess of 106^0 F.

The most important objective in the treatment of heatstroke is lowering the patient's body temperature *as rapidly as possible.* The longer the elevated temperature continues, the greater the threat to life.

TB Med 175 states: "Measures to lower the individual's body temperature should be initiated at the earliest possible moment. In the field the patient's clothes should be removed. If there is any source of cool water nearby the patient should be immersed in water, otherwise water should be sprinkled over the patient and its evaporation hastened by fanning. In addition to these cooling measures the attendants should rub the patient's extremities and trunk briskly to increase circulation to the skin. The patient should be removed to a hospital immediately and measures to cool the body should be

continued until the hospital is reached. During transportation the passage of air currents through the opened door of an ambulance will aid cooling. When the patient reaches the hospital further cooling measures should be carried out immediately . . ."

One attack of heatstroke predisposes to a second attack and care should be taken by the individual to avoid a second exposure to the precipitating condition.

Preventive Measures

Measures to increase resistance to heat injury are threefold:

- Replenishing water and salt losses from the body as they occur.
- Maintenance of optimum physical condition and avoidance of undue fatigue.
- Gradual acclimatization to hot environments.

Replenishing water loss: The human body is highly dependent on water to cool itself in a hot environment. A person subjected to high heat stress may sweat more than a quart of water an hour. This loss must be replaced or there is a rapid decrease in the ability to work, an increase in body temperature and heart rate, deterioration of morale and heat exhaustion. The ideal way to replace water loss is by drinking small amounts of water periodically throughout the work period. If activity is moderate and heat and humidity conditions are moderate the water requirement will be one pint or more per hour per man, preferably drunk at 20 to 30-minute intervals. As activities are stepped up or working conditions become more severe, water intake should increase accordingly.

Replenishing salt loss: Although the diet ordinarily contains an adequate amount of salt, if you are unacclimatized you should take additional salt during the first few days of exposure to heat. An acclimatized person will need additional salt under heavy heat stress when sweating is excessive.

The salt tablet issued by the Navy is a 10-grain impregnated salt tablet (FSN 6505-754-2828). Impregnated salt tablets have a membranous structure which prolongs disintegration in the digestive system. About half the tablet is dissolved after 45 minutes and the remainder over a period of some 2-1/4 hours. Thus, one such salt tablet provides more or less even availability of 10 grains of absorbable salt over a three-hour period. Plain salt tablets, such as used to make the 0.1 salt solution mentioned above in connection with the treatment of heat cramps and heat exhaustion, have cornstarch as a disintegrating agent and dissolve within two minutes. Salt in such concentrated form is not readily absorbed and can cause gastro-intestinal upsets. Extra salt at mealtimes, in the cooking and on the plate, will meet most usual requirements.

Physical condition: The general physical condition of a person has a significant bearing on his reaction to heat stress. The risk of heat injury is very much higher in overweight persons than in those of normal weight. Other conditions which increase susceptibility to heat include acute and chronic infections, reactions to immunizations, heat rash, acute sunburn, use of alcohol and fatigue. (Your flight surgeon can discuss with you the comprehensive list given in TB Med 175.) Once you have had an attack of heatstroke you are more vulnerable to a second. This is not true of heat cramps and heat exhaustion.

Acclimatization: A period of approximately two weeks should be allowed for acclimatization with progressive degrees of heat exposure and physical exertion. A period of acclimatization is necessary regardless of your physical condition although the better the physical condition the quicker acclimatization is completed. Acclimatization begins with the first exposure and is usually fairly well developed by the end of the first week. Persons who are unusually susceptible to heat will require additional time for acclimatization.

For your own sake and that of the men working or flying with you, you should be aware of the symptoms and treatment of heat injury and how you can prevent it in the first place. Forewarned is forearmed. ◄

B.C.

Not Wearing Mask

DURING level flight at 2500 ft, 250 kts, an A-4C was struck by a mallard duck. The impact shattered the starboard windscreen panel and broke off the after section of the glare shield and the starboard mirror. (See photo.) The mallard hit the pilot in the face (breaking off lower portions of his helmet visor) and scattered about the cockpit.

The pilot had his helmet visor down at the time but for reasons not reported *he had removed his oxygen mask.* Because of his facial injuries he was unable to put the mask back on for communications. He returned to base and landed unescorted. Having the visor down saved this aviator's sight and perhaps the aircraft but not having his mask attached presented problems he could well have done without.

It is well known in naval aviation that OpNavInst 3710.7D, General NATOPS, states that in pressurized combat and combat training jet aircraft oxygen shall be used by all crewmembers from takeoff to landing. We leave to your imagination what might have happened in this case if the pilot had not had his helmet visor down.

Ouch!

OVER the years *we've* heard of all kinds of good reasons for keeping *your* helmet on throughout the escape, survival and rescue evolution but here's a new one.

After ejecting over land from an F-8C, the pilot was picked up by helicopter. "The remainder of the rescue operation was uneventful," the investigating flight surgeon reports, "until the pilot lay down on the stretcher in the ambulance at the airfield where he was brought by the helicopter. The rear door of the ambulance was closed but the gurney (wheel stretcher) was not secured to the floor. As the enthusiastic driver sped off toward the dispensary, the gurney rolled towards the rear of the vehicle until it was stopped by the impact of the pilot's helmet (still on his head) with the rear door."

CO Poisoning

ON PREFLIGHT a T-28B pilot noticed that several dzus fasteners were not fastened on the firewall and directed the plane captain to secure them. The pilot visually rechecked to see that the fasteners were secured.

On take off for a one-hour test flight the pilot noted an excessive amount of heat coming from under the instrument panel. The heater was OFF but to be absolutely sure the pilot cycled the cockpit heater control switch. When this had no effect he pulled the heater circuit breaker. The heat continued and the pilot returned to the field.

On entering the landing pattern he experienced slight dizziness, severe headache and a general weak feeling. He opened the canopy at the abeam position and landed safely.

After shutdown, several dzus fasteners on the firewall were found to be loose.

The pilot was grounded for three days because of the effects of carbon monoxide. *It was determined that the firewall had*

notes from your flight surgeon

never been completely secured. This condition allowed carbon monoxide fumes from the engine exhaust section to enter the cockpit.

The squadron C.O. had two recommendations in this case:

- That on preflight, T-28 pilots check the dzus buttons on the firewall both visually, for being parallel to the outer edge of the door as specified on the front cockpit preflight checklist, and manually by pulling on the firewall door to be certain it is secured.
- That the importance of having the oxygen diluter level set at 100 percent with the oxygen mask plugged in and readily available at all times during flight should be stressed to all T-28 pilots.

Rule of Thumb

PERSONNEL have been reporting in increasing numbers to the dispensary for ear plugs, a recent safety council meeting reports.

"This indicates that the word is getting around that such ear protection is available," the council states. "Supervisors are encouraged to continue to emphasize the need for use of ear protectors in the line areas when jet engines are operating. Of equal importance is the need to advise personnel who are not required to be on the flight lines that they should avoid lingering in those areas for prolonged periods. A rule of thumb to be observed is that: after a few minutes in a noise area, if one's ears begin to feel uncomfortable, one should immediately leave the area."

Protection and prevention are always better than "cure." If your ears hurt in a noise area damage is being done. Wear your ear plugs and/or mickey mouse attenuators whenever you know or feel that noise will be encountered. Without this equipment you might well be "*Hear* today – gone tomorrow."

Pistol Lanyard

"FOLLOWING water entry after parachute descent, the pilot lost his .38 cal. pistol. It is felt that this loss could have been prevented if the pistol had been secured to the holster by some type of lanyard. With the exception of this minor incident, the pilot executed his ejection and subsequent water survival procedures in an excellent and completely correct fashion."

ACCIDENT INVESTIGATORS

- *Air Crew Systems Bulletin 157 of 28 June 68, Survival Equipment Vest Type SV-2, refers: "The pistols are secured to the vest by a lanyard line (Type I suspension line MIL-C-4030) by means of a bowline knot. Tie the lanyard line through the trigger guard of the revolver or to the lanyard loop on the butt of the automatic."*

Compromises Protection

THE RIO of the crew of an F-4B which crashed and burned sustained burns of the left forearm. He had ripped both sleeves of his nomex flight suit so he could roll them up when he wasn't flying.

Flight surgeon's recommendation: "All aircrewmen should be reminded that nomex flight suits are not to be modified in any way which could possibly compromise their primary purpose – to protect the wearer from thermal burns."

Embarrassing

APPARENTLY, a pilot ejecting from an A-4E was unaware that the bailout oxygen system actuates automatically upon ejection. He states that during a series of engine explosions prior to ejection he was not receiving oxygen so he undid the left side of his mask. When he decided to eject he "spent several seconds trying to locate the ring to supply emergency oxygen but couldn't find it and elected to eject without the mask in place." As might be expected, during the ejection he lost his helmet and oxygen mask.

"The chin strap was not tight," he says, "and the oxygen mask separated from its hose because it was still attached to the helmet on one side. As I came down the only noise I heard was oxygen coming from the separated oxygen hose indicating the bailout bottle worked."

How well do you know your emergency survival equipment and procedures? Ignorance is not bliss – it can be embarrassing and it can "embarrass you to death."

Merits Reemphasized

WHEN an A-4E pilot ejected, the toe leather of his right boot was lacerated but his foot was uninjured. This serves to reemphasize the merits of steel-toed flight boots, the investigating flight surgeon states. ◄

The ejection of an A-7A pilot, on a black and windy night, set in motion a host of troubles which plagued rescue operations. The SAR effort was further extended when, as pilot and swimmer were being hoisted, the swimmer fell off the rescue seat and back into the rough seas without flotation gear or signals. He managed to stay afloat for nearly two hours before he was finally located and rescued in a semi-conscious state. Consistent with the way things had been going that night, his pick-up was other than routine.

Host of Troubles

IT all began during initial carquals. On the A-7A pilot's third approach the aircraft struck the ramp and exploded on impact. As the intact forward portion traveled over the angle deck, he was able to eject. The time was 2213.

The decision to go was made rapidly.

"I heard the 'thud' of ramp impact and felt myself being pitched forward," the pilot recalls. "I started to rotate forward and seemed upright. The green datum lights were coming under my nose and they were horizontal. It was then that I decided I was in a good position to get out."

He reached up with both hands and pulled the face curtain.

After what seemed like an eternity, the seat fired. Another eternity seemed to pass before the chute opened – just as he was reaching for the D-ring, the canopy blossomed. He hit the water and went under as he felt for the toggles on his Mk-3C. He pulled the left toggle, surfaced and removed his helmet which had rotated over his face. Then as the wind filled the canopy, the chute began to drag him through the water. (Winds were reported at 27 kts. Waves were 8 ft at 5-second intervals.) The partially inflated Mk-3C kept his head above the surface but he was unable to turn over on his back. On release of the right koch fitting, the chute deflated.

"When the chute stopped pulling me," he states, "I tried to get the other koch fitting but could not because my hands were too slippery with my gloves on. Using my teeth, I pulled my gloves off and threw them away. I released the left koch fitting, then realized that something was tugging me down. At first I thought I was still tangled in the seat. Then I realized that it was the seat pan. I didn't try to deploy it – I just wanted to get rid of it which I did by releasing the rocket jet fittings."

By this time the pilot saw the plane guard helo. After initially searching above his Mk-3C for his day/night signals, he found one on the right side under the life preserver. Selecting the night end by the bumps on it,

after one unsuccessful ignition attempt, he lit it with a "good yank" and pointed it at the helo.

The area aft of the carrier was well-lighted by burning wreckage, smoke flares and wands from the ship. The helo copilot sighted the survivor when he activated his night flare, turned the aircraft landing light on him and saw that the survivor was still in his chute.

"The night flare didn't last as long as I thought it would," the A-7 pilot states, "but it did last long enough for the helo to get to me and to get his spotlight on me. It was about this time that I realized that I was not completely free of my chute and shroud lines – I was still tangled in something. I started struggling to get free but it didn't do any good. By now the helo was close with his spotlight on me. I lit off the day end of the flare so that he could tell which way the wind was blowing."

The helo lowered a swimmer on the seat to assist the survivor.

Normally, the swimmer would have had his life vest on. This particular time he did not, he told investigators. "When I heard the LSO yelling for power to an incoming aircraft, I glanced out of the window in time to see a great ball of flame, an ejection seat rocket and a good chute. I pulled off my boots and my Mk-2 vest in an attempt to remove my flight jacket which was under it." Time was of the essence so he went into the water without his flotation gear.

After some problems of being bounced in and out of the swells, the swimmer got off the seat and swam over to the survivor. Both men used their shroud cutters to sever shroud lines.

"When we finished cutting the lines," the pilot recalls, "we discovered that the parachute itself was caught in the safety clamp hook which joins the hoist cable and the rescue seat. I tried to cut the chute free with the shroud cutter but this didn't work. After much thrashing around we managed to push the spring-loaded safety latch in and free the chute. We still had some lines around us but got free of them and swam away. Meanwhile the hoist had drifted away from us. We either swam to the seat or it was dragged to us – I can't remember which – and the swimmer put me on it. I sat on two of the prongs, he sat on the third and they hoisted us up. We turned around once and then started to swing underneath the helo but pushed off. (Neither of us had a helmet on while on the hoist.)

"The helo crewman operating the hoist got us to the top and pivoted us so as to have my back to the door. He grabbed me by the collar and began to pull. While he was pulling, the swimmer slipped off the seat. He grabbed my right leg with his left arm and I managed to get my left leg under his right armpit but we couldn't get in the helo that way. I called the crewman's attention to the fact that the swimmer had slipped and motioned for him to let us back down into the water.

"Meanwhile I had gotten tangled in the hoist crewman's mike cords. When he began to let us back down I was all tangled up so he started to bring us back up and the swimmer fell. The hoist crewman pulled me inside the helo and they started searching for the swimmer. We couldn't spot him as we had been moving forward when he fell off the seat and we lost sight of

him." The time was 2222. *The swimmer had no signals except an inoperative strobe light.*

Of this sequence of events, the helo pilot notes that the hoist crewman had never had an overwater training hop and had never even operated the hoist. "Through absolutely no fault of his own," the pilot reports, "the crewman was not trained for his job. Because of a critical shortage of available aircraft and personnel at the squadron level, we had been utilizing non-crewmen – aircrew candidates who have not yet completed a crew training syllabus." The helo pilot recommends that only fully trained and certified aircrewmen be used for operational flights that could be involved in an actual rescue situation, a recommendation which subsequent endorsers strongly concurred in. *Amen! – Ed.*

During the rescue, the helo pilot glanced over his shoulder and saw the two men being pulled into the cabin. At this time he increased his hover altitude to 40 to 50 ft. He was not receiving any information over the ICS and after several seconds, thinking the survivor and swimmer must surely be in the aircraft by then, started to slowly break hover. The copilot was standing by on emergency throttle, an emergency procedure suggested by the squadron when a dual-engine flameout condition might be encountered. (Because of the low hover altitude, the helo had been exposed to a considerable amount of salt spray.) Just as the pilot broke hover, the hoist crewman reported that the swimmer was still in the water.

"I was so shocked it took a second for me to react," the helo pilot remembers. "I backed the helo up to what I thought was the spot but we could find nothing with the searchlight." Circling the area, the crew began a random search along the line of flares thrown overboard at the scene of the crash. The helo continued a low altitude search for 20 minutes, with negative results, before being relieved by a second helo and landing aboard ship.

The second helo continued the search for the swimmer. After an hour and a half, he was sighted and a smoke flare was dropped to mark his location. The helo circled and came up on the flare but the crew was unable to spot him. After several more passes he was again spotted and the helo came into a hover over him. The rescue seat was lowered but in his weakened condition the survivor was unable to get on it. A swimmer from the helo jumped into the water, swam to him and inflated his own life vest. Because of the high sea state and the survivor's numbed condition getting him on the seat was next to impossible. He was just barely able to stay afloat. Water temperature was 57^0 F, air temperature 58^0.

The swimmer got the survivor and himself on the seat but could not find the retaining strap. He gave a thumbs up signal and they were hoisted. Half-way up the survivor fell off the seat. The seat was again lowered. The swimmer deflected the seat with his hand as it narrowly missed hitting him in the head. Although the wind made the seat oscillate and spin, he was finally able to grab it and once again got himself and the unconscious survivor on the prongs. This time he was able to find the strap and fastened it around the survivor. They were hoisted and, with some difficulty, brought into the helo. The survivor was suffering from exposure but was otherwise in good condition. He remembers nothing of all this although he does recall kicking the water to attract attention when helos flew by.

So ends the story of the rescue of two men under extremely difficult conditions – two saves – a host of troubles – and a multitude of survival lessons – both do's and don'ts.

Is Safety

THIS question is asked from time to time by individuals who have an honest concern that some of the actions justified in the name of safety may, in fact, be unsafe. Is such a concern valid?

If we interpret safety to mean:

- Not exploring the operating envelope of the aircraft because we can get into trouble;
- Not practicing emergencies because some people who do so goof and get into trouble;
- Not properly equipping ourselves with flight and survival gear because it implies a lack of confidence about the outcome of the flight;

Then safety could indeed be dangerous because:

- You might meet an opponent in the air who knows all there is to know about the operating envelope of *his* aircraft;
- You might have a real emergency and not having drilled yourself in emergency procedures, you may not know what action to take;
- And if you unavoidably crash or have to abandon your aircraft without proper flight and survival gear, you may find yourself in an even worse situation.

On the other hand

If we interpret safety to mean:

- Knowing what to do;
- When to do it;
- How to do it;
- And doing it;

The answer is a resounding *No!*

It is evident then, that ***safety*** in naval aviation can be a matter of considerable interpretation.

How Should Naval Aviation Safety Be Interpreted?

Outstanding literature on the subject, including utterances by many prominent aviation commanders, contain authoritative statements indicating that it should be interpreted *in a positive manner so as to improve combat readiness and at the same time achieve a substantial reduction in the aircraft accident rate*.

This statement automatically disallows an interpretation which contemplates locking up all aircraft in order to insure the absence of inflight aircraft accidents. But more than that, this statement recognizes that naval aviation has a mission to perform – to maintain a combat ready force. Recognizing this fact – as we must – our interpretation of *safety* must accommodate it.

There are those who could argue convincingly that flying in the daytime will be safer than flying at night. But when we come to the implication which seems to follow, that, "Therefore, we should only fly in the daytime," we in naval aviation must demur in this thinking because such a proposition does not accommodate our basic reason for being. However, being rational beings we are not at liberty to reject the fact that vision is reduced during nighttime. Our alternative is to develop and utilize all safeguards possible to prevent nighttime accidents – without derogating our reason for being – mission accomplishment.

Someone may say, quite truthfully, that it is potentially more dangerous to engage in dive bombing practice than it is to fly straight and level; however, any prescription that all flight must be straight and level

Dangerous?

obviously will not fill the bill.

If one argues that practice tactics flights increase the potential for accidents we would have to agree but we also note that a complete lack of such flights will leave us unprepared for mission accomplishment in a very important area. What we must do is take all possible steps to insure that such flights are conducted with optimum regard for *both mission accomplishment and safety*.

What it all boils down to is that neither of these objectives can be pursued to the exclusion of the other, e.g., locking up all the aircraft will derogate our mission capability beyond tolerable limits. On the other hand, any inclination toward pursuit of mission accomplishment at any price must be severely questioned. Experience has shown that some potentially desirable missions simply are not worth the probable loss of valuable assets – lives and aircraft. Even worse is to lose assets as a result of embarking on a flight or mission for which there is no justifiable need.

All of this places some severe demands on naval aviation supervisors. It demands the finest discrimination on the part of the supervisor who must come up with the optimum course of action after considering many factors, including the answers to these questions:

- Is this mission justified?
- Is the pilot qualified by training and experience to perform this mission?
- Considering the prevailing conditions (weather, operational commitments, state of aircraft maintenance) should this mission be rescheduled for another time?

There are many other questions which could be asked about a particular mission but these illustrate the point that the finest judgment must prevail at all levels of supervision if the demands of combat readiness and naval aviation safety are to receive due consideration. An error in judgment in one direction may result in mission failure; an error in the other direction may result in a totally unnecessary loss of lives and aircraft.

Now, lest you think we are talking only about the front-line commander who must decide whether it's worth the probable cost to launch a combat strike, let us assure you that we are talking about supervision at every level. It may be the flight instructor who is about to decide whether a student is ready to solo or it may be the C.O. pondering whether to approve a cross-country request .... In fact, it could be any supervisor who has to make such a decision. What is the optimum course of action? It's something to think about and it's often a question that only you, the on-the-spot supervisor, can adequately answer.

Naval aviation safety by any definition, includes positive steps to prevent accidents. One of the most positive steps we can take in accident prevention is to ensure, insofar as possible, that the training and experience of personnel is equal to the mission requirements. If they are not, it is a pretty good indication the mission should be cancelled or reassigned. The role of the supervisor has already been touched on but it is also obvious that naval aviation safety demands an informed, studied approach by all hands – the professional approach. Simply stated, this means:

Readiness through safety and safety through readiness.

Adapted from material submitted
by LT T.A.Myers
RVAH-3

HYDROSTATIC TESTS FIND BLC LEAKS

A positive means for detecting bleed air system leakage in *Phantoms* improves BLC reliability ensuring flight safety.

PHANTOM pilots can take heart in knowing that boundary layer control systems in their aircraft will function more reliably in the future. An effort to reduce F-4 inflight failures and damage caused by bleed air system leaks has resulted in the development of a successful method of testing the system.

Evaluations of prototype hydrostatic testers have produced gratifying results in detecting leaks and testing the system after repairs, ensuring system integrity in flight.

In the F-4, bleed air from the compressor section is ducted along the leading and trailing edges of the wing and is expelled through nozzles located aft of the center and outer leading edge flaps and forward of the trailing edge flaps. This high temperature, high velocity air, directed over the wings and flaps delays airflow separation over the airfoil. This results in sustaining lift at speeds slower than normally obtained, hence lower landing speeds.

When failure in the ducts or leakage from the couplings occurs, hot air ranging from 500°F to 1000°F escapes at about 300 psi from the system and impinges on unrelated and unshielded components. This results in material damage to the aircraft and possibly ultimate loss.

An example of BLC failure is a fatal accident in which an inflight fire developed. The fire originated at a wing fuel quantity probe fitting. Hot air leaking from the BLC ducting to the leading edge flaps melted the fitting and ignited the escaping fuel.

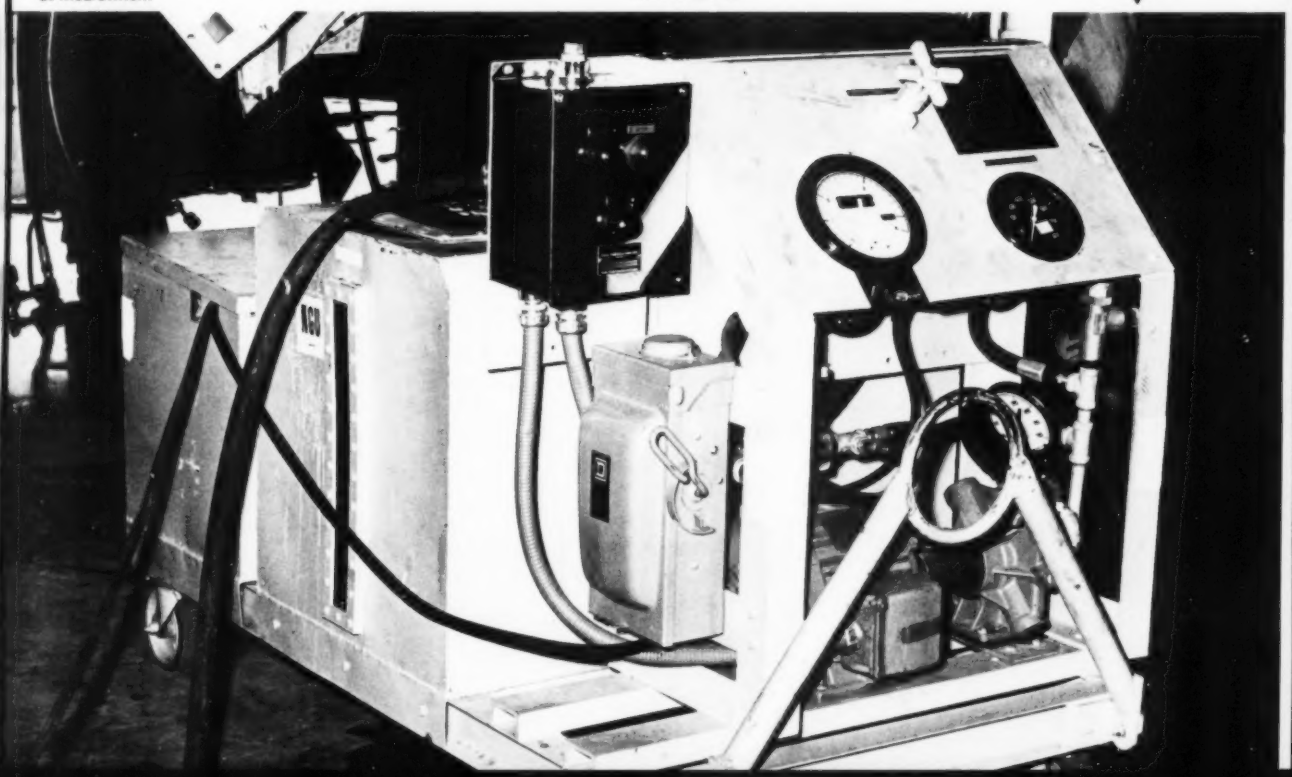
The effect of bleed air leakage is dramatized by this episode resulting from direct enemy action. A 50 caliber round went through the right ramp, severed the bleed air line and penetrated the rear cockpit decking. Hot air caused the burning of a wire bundle. Power on both generators was lost and smoke filled the rear cockpit causing the RIO to jettison the rear canopy. Loss of utility hydraulic pressure and hook cable damage precluded an arrested landing.

Naval Air Test Center, Pax River suspected BLC leakage in one of its aircraft. On borrowing a hydrostatic tester from NAS Oceana serious leakage was found beneath the No. 1 and No. 2 fuel cells.

A series of tests by NASCRePac indicated six out of

Preliminary tests were made with a jury-rigged hydrostatic tester at McDonnell.

Prototype built by NARF, Cherry Point. Production units will resemble this compact, simple-to-operate model used by AMD, NAS Oceana.



every seven aircraft hydrostatically tested BLC systems needed additional maintenance to ensure integrity of the bleed air system. Their report: "Believe hydrostatic testing only valid procedure to ensure integrity of the bleed air system."

MAG-33 reported testing 14 aircraft and only one aircraft passed the test. So far the testing has shown that nearly all aircraft had been flying with previously undetected leakage.

A review of mishap reports recorded at the Safety Center shows 32 boundary layer control accidents and incidents occurring over a 14-month period ending March 1969. Of these mishaps, six resulted in major accidents known to be caused by BLC failure, three suspected. The remainder of mishaps resulted in incidents, 19 involving the F-4B and four the F-4J aircraft.

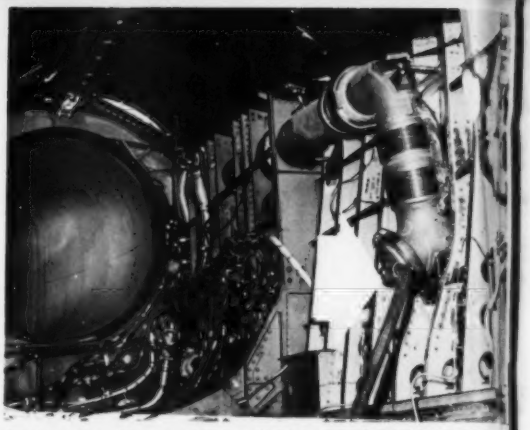
By way of comparing existing field test procedures using compressed air and the test using water pressure, here are the procedures:

Air Tests

1. A maximum pressure level of 350 psi is specified.
2. Remove the leading edge flap BLC shutoff valves and cap the ducts upstream of the valves.
3. Remove the bleed air duct installed between engine and keel. Ducts from the engine to the trailing edge flap are not tested.
4. Pressure decay rate is used to determine system acceptibility.
5. Check to determine that all leakage is not in one given area by feeling for air leakage.

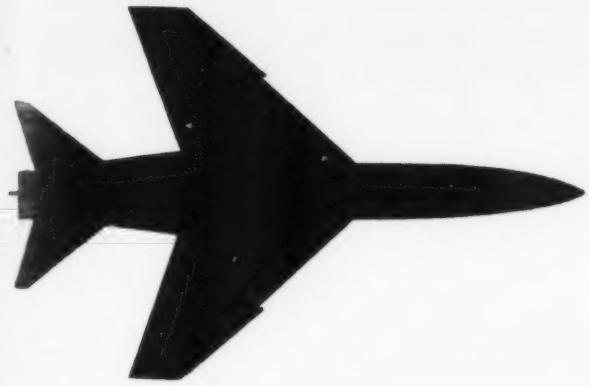
Hydrostatic Tests

1. A maximum pressure level of 470 psi is specified.
2. The leading edge and trailing edge BLC shutoff valves are closed and serve as system caps.
3. Bleed air ducts from engine to keel and from engine to trailing BLC duct remain installed and are leak-tested.
4. Visual determination of system leakage (see photos).



Water pumped into engine manifold duct indicated by arrow (6L and 83R with engine installed) . . .

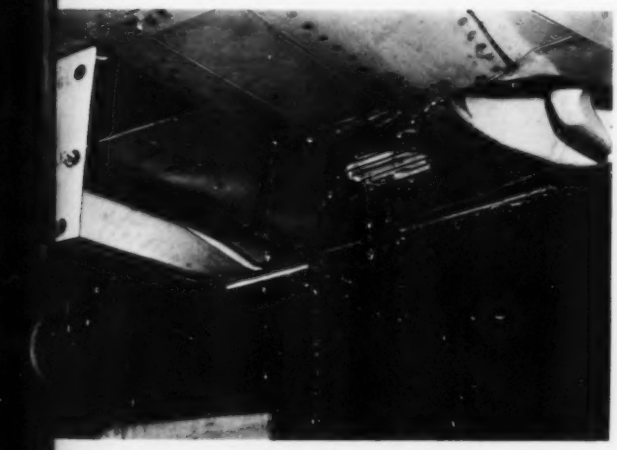
. . . trapped air is bled off upstream at gate valves (doors 6L and 6R) until a steady stream flows . . .



5. The maximum flow rate of leakage through shutoff valves proves valve acceptibility.

Advantages of Hydrostatic Tests

1. Pressure levels more nearly simulate actual ducting design conditions of 300 psi at 940°F. (*Hydro test:* 470 psi at ambient temp equivalent to 300 psi at 940°F. *Air test:* 350 psi at ambient temp equivalent to 224 psi at 940°F.)
2. Periodic tests in service repeat tests by manufacturer on each aircraft before delivery and ensures system integrity.
3. A greater portion of the system is tested.



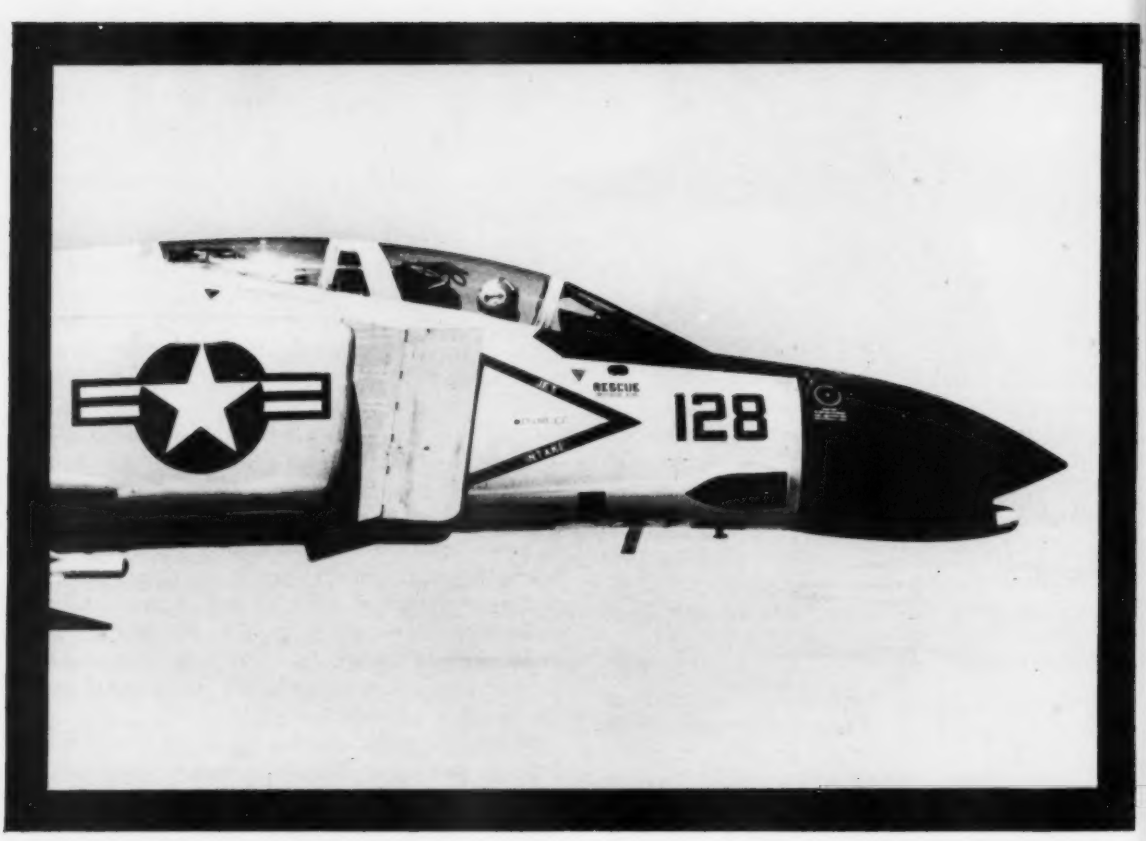
. . . with gate valves closed, system is checked at 470 psi for 5 minutes. Leaks such as this have been located by this method. No leakage is allowable from fuselage ducts; coupling leaks should not exceed 1 drop per second.

4. Takes less time to accomplish. Pressure test by air requires the removal of eight clamps not normally removed for the hydrostatic test, saving several man-hours.
5. Visual checks of system integrity provide positive determination.
6. Less hazardous to personnel and aircraft if failure occurs (due to lower energy level).
7. Maintenance activities are more inclined to conduct periodic system tests since the test is less complicated and simpler to accomplish.

Hydrostatic units used by the activities mentioned here are prototypes. Evaluations have brought forth a few minor modifications such as increased pump capacity (10 gph vice 4) and a universal type pump motor. Shipboard models will include means for tiedown chains and installation of brakes or locks for wheels. Specifications for production models have been firmed up and orders have been placed for 32 units. Initial deliveries are scheduled for August of this year and completion by July 1970. Present plans call for deliveries to NARFs and to each Marine Corps and Navy IMA supporting F-4 aircraft.

It is conceivable that until production model hydrostatic testers become available the practice of borrowing units will continue. Before you undertake such a project make sure you have enough seals available. One unit reported that the usage of seals MAD 06-007 and 50887-450S went up 150 percent during hydrostatic tests causing a local supply shortage.

With new aircraft being tested by this method, a follow-on test during each periodic inspection, or whenever repairs are made to the system plus still another test during PAR cycles, the pilot's confidence in BLC and other bleed air systems in the *Phantom* should increase. High priorities have been assigned to make this equipment available. With its use, phantom leaks should disappear in the *Phantom.* ◄



More Thrust From Dry Air Than Moist

WHEN CHECKING engine performance, the effects of humidity must be factored into the calculations. Occasionally we find the misconception that moist air is heavier than dry air. Actually, dry air is heavier – this is why an engine produces more thrust on a dry day than it does on a humid day.

Avogadro's Law, which concerns the number of molecules present in a volume of gas, states that equal volumes of all gases contain the same number of molecules when at the same temperature and pressure.

The weight of a gas is proportional to its molecular weight (the sum of the atomic weights of all atoms in a molecule). The molecular weight of dry air is 28.952 and an approximation of this value can be derived by the summation of the products of the constituents' molecular weights and the percentages by weight of the constituents in the mixture. This is shown in the following table:

Constituents of Dry Air	Molecular Weight	Percentage by Weight	Product
Nitrogen	28.016	75.800	21.240
Oxygen	32.000	23.220	7.430
Traces of Carbon Dioxide and Inert Gases			0.282
		Total	28.952

Water vapor in air behaves like a gas. Its molecular weight is 18. As previously stated, a fixed volume of gas at constant temperature and pressure always contains the same number of molecules, regardless of the kind. Therefore, for each molecule of water vapor present in atmospheric air, a molecule of air must have been displaced. Since the molecule of water vapor weighs less than the molecule of air (18.000 versus 28.952), it follows that a given volume of air containing water vapor weighs less than an equal volume of dry air. ◄

GE "Jet Service News"

MURPHY'S LAW*

Hot Cup Murphy

During a thorough aircraft cleaning an industrious crewmember gave the P-3's galley area a good going over. To rid the hot cup area of soup stains he removed the hot cup receptacles. After satisfying himself that everything was clean he reinstalled the receptacles.

Two days later, upon completion of their preflight, the pilots were standing in the galley area discussing the forthcoming flight. One of the pilots had plugged in the left (aft) hot cup to heat some water for Sanka. Shortly thereafter the odor of excessive heat plus some smoke emerged from the right (forward) hot cup which had not been turned on. The aft hot cup, which had been turned on, was very cool.

Investigation revealed that the conscientious crewmember had reversed the receptacles even though they were plainly marked "left" and "right" (see photos).

The dangers of such a situation include fire and possible explosion of the extremely hot aluminum cup. Fragments of the cup would present a serious hazard to crewmembers in the galley area.

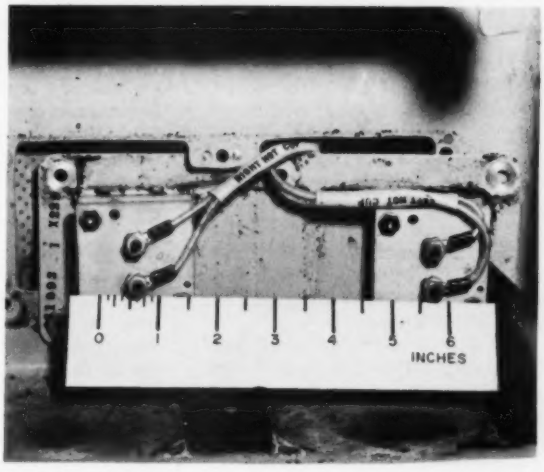
The following procedures are recommended for hot cup use.

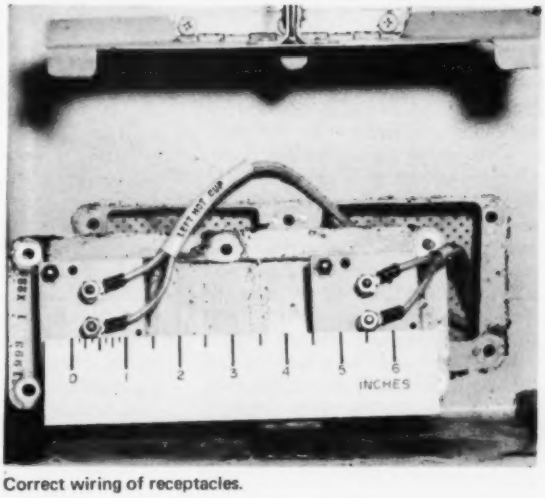
- Only plug in hot cups when they contain food items which are to be heated. When not in use place the cups in holder at a 45-degree angle to the receptacles. When stored in this fashion the cups will not be plugged in and are securely held by the retaining clamps.
- When turning on a hot cup, check to ensure that the selected cup is heating.

Maintenance personnel – remember that even the simplest task can lead to an accident or incident. Always perform each job as though the safe return of the aircraft and crew depend upon it – it does! ◄

Contributed by E.K. Anderson, ASO, VX-1

Reversed wiring of receptacles.





Correct wiring of receptacles.

* If an aircraft part can be installed incorrectly, someone will install it that way!

Letters

The mind, like a parachute, works only when open.
Anon.

Idiot Flights

FPO New York – I read with great interest your Jan 1969 article entitled, "On Bringing up the Flight Instructor." As a member of the VT-28 Standardization Board during the time the "student" was undergoing his IUT training, I can assure you that he in no way exaggerated the type of mistakes introduced to the IUT on his *idiot flight*. In fact, I suspect that there were some planned omissions so as not to spoil the effect of future flights.

In order to completely answer your question, "Are *idiot flights* safe?," I feel that we must first think along the same lines. From your statement on page 10, "Nevertheless, there's no doubt that it describes a flight where the standardization pilot tries to see if he can put something over on the prospective flight instructor," I feel you may have misinterpreted the theory behind the *idiot flight*. It was never intended to be a test, check flight or initation harrassment. It was conceived as a vehicle to promote flight safety through the exchange of experience in a controlled environment. A great deal of time and instructional experience were utilized to develop this flight and the errors demonstrated and reactions observed were constant subjects of attention during standardization board meetings. Although the techniques utilized were not published in the Training Manual or Syllabus Guide, they were nevertheless constantly reviewed, revised and improved.

"Are idiot flights safe?" Perhaps we should ask first, is flying safe? We will all agree that there are inherent dangers in the profession, however, with proper training and continued use of good judgment most aviators will grow old gracefully. The secret of a good *idiot flight* is as you have stated, a thorough briefing. This includes not only the IUT but also the plane captain, taxi directors, tower and approach control personnel. The problem of "who has the aircraft" has been with us as long as we have had aircraft with two sets of controls and two pilots. I expect it will always continue to be. To properly conduct the *idiot flight* a definite signal must be prebriefed so that the IUT understands that when it is given the pilot who signed for the aircraft will be responsible for handling the situation. Having conducted numerous *idiot flights* myself, I have never encountered a situation in which the IUT would not relinquish control of the aircraft when so instructed. This is not to say, of course, that the situation cannot occur, however, I have always felt there was less danger of it happening with an IUT than with a student. In my opinion, *idiot flights*, when properly briefed and conducted by well qualified and experienced personnel, are as safe as flying itself.

"Do they violate NATOPS?" Many of the common errors described by LCDR Zagortz are violations of NATOPS, therefore, specified NATOPS procedures and techniques must be performed incorrectly to demonstrate these errors. At no time, however, is the spirit of NATOPS violated, that being the continued operation of an aircraft utilizing those procedures found to be best through experience. I have yet to find a paragraph in the NATOPS manual which prohibits the demonstration of nonstandard procedures for training as long as there are no violations of OpNav instructions.

"Are idiot flights worthwhile?" Over the past several years the accident-free records of many Advanced Training Command squadrons have been a source of pride to the commands and to the naval aviation safety program, with records of over 100,000 accident-free hours being set, the officers and men of these organizations can certainly take great pride in their professional performance under the conditions which exist. Did the *idiot flights* contribute to these safety records? From my own experience of three years of instructing in the Advanced Training Command I definitely believe it did. Perhaps I could have handled some of those unusual situations with which I was faced without an *idiot flight* but it defintely aided in seeing them coming. What of the SERGrad who has only the experience of the Training Command and IUT period to fall back on? I believe that these flights have greatly aided them. The name of the game is "prevent accidents" and the *idiot flight* is another tool with which to accomplish this goal.

Allow me to add a few items to your list of goofs:

1. Putting the carb air switches ON instead of opening the cowl flaps on the downwind leg. This makes for an interesting takeoff from that touch-and-go.

2. Checking No. 1 engine clear and then pushing the starter switch to the right and watching No. 2 engine crank over; the student is always certain that he engaged the No. 1 engine starter.

3. When a student really blows an approach to the point that the instructor has to take the aircraft and waveoff, the student has to be helpful but why is it that the only thing he can think to do to be helpful is to raise the flaps before the power is fully applied . . . . that old sinking spell.

The procedures followed in the fleet

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

squadron of which I am now a member are somewhat similar to the *idiot flight*. During the NATOPS and patrol plane commander check flights proficiency in handling emergency situations from the right seat must be demonstrated and the prospective plane commander is required to act as instructor while the check pilot executes a few typical "how-not-to" approaches. The newly designated first-tour patrol plane commander is given quite a bit of responsibility not the least of which is the training of other first-tour and second-tour pilots. The pulling of a few circuit breakers or practicing engine-out landings does not fully prepare him for this responsibility.

Certainly the development of a highly skilled and proficient instructor is the goal of the IUT training syllabus, however, the *idiot flight* was considered as just an additional tool of preparation. Even the best pilot studies his approach plate prior to commencing an approach. Why shouldn't the prospective instructor be given a realistic look at what he will be faced with?

C. F. Williams
LCDR, USN
ASO, VP-26

• We are in close agreement with your comments but we feel that your statement, "I have yet to find a paragraph in the NATOPS manual which prohibits the demonstration of nonstandard procedures for training as long as there are no violations of OpNav Instructions," needs comment. It is true that there is a great deal left unsaid in the NATOPS manuals concerning the necessities involved in the training of student naval aviators – and the instructors who train the students; hence, the need for Flight Training Instructions and Syllabus Guides. Moreover, the training of a plane commander seems analogous to the training of an instructor in that he will often be functioning in the role of a flight instructor. We mention this to point out that the operative word in your statement which we have quoted above is "training." If there exists a bonafide requirement for particular training we can see no reason for excluding such training even if it involves procedures which are not now set forth in NATOPS. Having said this, we do not believe that there exists any *carte blanche* for performing nonstandard maneuvers *except* as may be dictated by a bonafide training requirement and then only to the extent authorized by responsible commanders. Inasmuch as Flight Training Instructions and Syllabus Guides supplement NATOPS, it seems that a desirable method of achieving standardization in those cases where there is a recurring training requirement, would be to set forth the need (and precautions) for such training in the aforementioned publications. We are in complete agreement with your statement that no such flight should be undertaken without a careful preflight briefing.

Lift/Weight/Thrust/Drag

MCAS Quantico – In regards to March 1969 APPROACH's "Flyboy Interview". Mr. Helo states, "Lift and thrust still must exceed weight and drag in order to become airborne or maintain flight". On page 150 of *Aerodynamics for Naval Aviators* (NavWeps 00-80T-80) H. Hurt states the following: "When the airplane is in steady, level flight, the condition of equilibrium must prevail. The unaccelerated condition of flight is achieved with the airplane trimmed for lift equal to weight and the powerplant set for a thrust equal to the airplane drag." Isn't this true for helicopters too? I suspect that Mr. Helo was still speaking "by the seat of his pants" when he said otherwise. Enjoyed the article.

HMX

• Glad you enjoyed the comments of Mr. Helo. He was a pleasure to interview and he will have more to say upon his return from Vietnam in a few months. A certain amount of his theories on basic aerodynamics were slightly coated with a salt encrustation but being the knowledgeable gentleman that he is he was permitted to mix a metaphor or two. He has never been content with an unaccelerated condition – but only with a *go* condition.

Last Chance Arrestment Aid

FPO, New York – On Carrier Air Wing TEN's recent combat cruise to southeast Asia the returning aircraft would occasionally arrive at the ramp with only a couple of tries at the deck because of a large number of recoveries, combat damage and low fuel states. In some cases with a combination of other problems, such as just mentioned, the aircraft would get a hook-skip because of an underserviced hook or a pilot induced pitching moment. In at least a half dozen cases the pilot would have fuel for one last pass prior to taking the barricade after one or more hook skip bolters.

On *USS Intrepid* when these last (must trap) passes came up we would raise the last two wires off the deck with full rolls of new toilet tissue. This would be accomplished by spacing at least four rolls under each wire across the deck. Not only does this raise the wires if they happen to be sagging but it seems to prevent a low-serviced hook from skipping, especially in the A-4 or F-8.

When the aircraft traps, the toilet tissue breaks apart or kicks harmlessly off the deck, presenting no danger to deck crews forward or LSOs aft. A case of toilet tissue was kept at deck edge by the arresting gear crew and could be in place within seconds when requested by the LSO. I am convinced that several aircraft were saved from the barricade by this simple procedure.

Roy E. Lester
CVW-10 LSO

• Sounds like a good idea to help keep from being wiped out. We're happy to pass it on for consideration by other Fleet units. ◄

Vol. 14 **approach** No. 12

RADM Roger W. Mehle
Commander, Naval Safety Center

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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Next Month

In Case of Emergency:
A Discussion

Credits

Cover painting by Chuck Witcher shows F-4J's on station roaring into action. Courtesy McDonnell-Douglas, St. Louis, Mo. **Pg 10-11** Photos by Art Schoeni, courtesy LTV. **Pg 26** Ceramic sun, collection of Robert Trotter. **Pg 31** 'B.C.' by Johnny Hart, by permission of Johnny Hart and Field Enterprises, Inc. **Pg 44** Photo by Ed Holm, courtesy Naval Institute Proceedings. **OBC** Lettering by DM2 Frank Royce

THIS IS SAFETY

So is this . . .

and this,

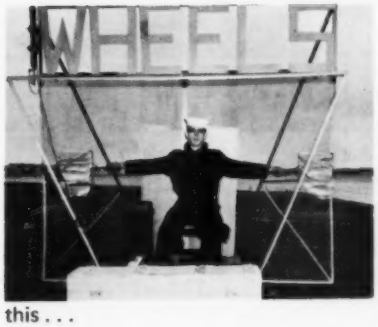
this also . . .

and this.

This is safety, too . . .

along with this,

L/D LIFT and DRAG



this . . .

and this.

The picture naval aviation safety makes is a remarkable mosaic, but it all adds up to a single common denominator: no matter how good the equipment or qualified the personnel, chances are the man who has no regard for his own personal flight safety is certainly not going to look out for the safety of others.

FOD

FOD has many faces. What's good for you is not good for a jet engine. This magazine could be FOD. Do not carry it where jet aircraft are turning up.

It could be embarrassing.

sing.